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Investigation of the Prevalence of Learning Disabilities Within the Home-School Population of Southwest Michigan

Paul Steven Kitchen
Andrews University

Andrews University

School of Education

INVESTIGATION OF THE PREVALENCE OF LEARNING DISABILITIES WITHIN THE HOME-SCHOOL POPULATION OF SOUTHWEST MICHIGAN

A Dissertation

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Paul Steven Kitchen

July 1995

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APPROVAL BY THE COMMITTEE:

Chair: James A Tucker

Director, Graduate Programs: Jerome D Thayer

Member: Timothy E Spruill

Dean, School of Education: Warren E Minder

Member: Derrick L Proctor

External: Benjamin D Schoun

07-13-1995
Date Approved

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ABSTRACT

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by

Paul Steven Kitchen

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Problem

The special education needs of home-school children have rarely been studied. This research utilizes the home-school population of Southwest Michigan to investigate the incidence of learning disabilities (LD) within this group. At the same time, it is possible to investigate some of the criticisms of the learning disability field of study.

Method

Two hundred ninety-eight home-school children in southwest Michigan were assessed for LD using the Michigan State Board of Education definitional criteria. Achievement was assessed by use of the Wide Range Achievement

Test, third revision. Ability was measured with the Wechsler Intelligence Scale for Children, third revision. A discrepancy of 18 standard score points was used to determine possible LD. Subjects were then examined for the presence of other factors that would explain the learning problems of subjects having a severe discrepancy between ability and achievement.

Results

Of the sample group, 3.7% were found to exhibit learning problems that could not be explained by other than a diagnosis of LD. A significant relationship was found between levels of teacher involvement and the presence of learning problems.

Conclusions

A lower prevalence of LD is found within the home-school population when compared with Board of Education figures of public school prevalence rates. However, this difference was not statistically significant. The concept of LD is problematic from the standpoint of definition and assessment and might better be conceived as Learning Difficulty Syndrome. Learning problems appear related to teacher involvement.

CHAPTER 1

INTRODUCTION

One of the fastest growing phenomena within education in America is the move toward parents providing the bulk of their children's education at home rather than sending them to either public or private schools (Kitchen, 1991). This has surprised some who have studied this phenomenon for many years. One researcher stated that "on balance, then, the home-schooling movement appears as a tiny countervailing trend, and it seems likely that it will continue to grow--but at a slower rate" (Lines, 1987, pp. 510-517). This has not been the case. Estimates of the number of children being schooled at home suggest that as many as 250,000 parents were teaching their children at home in the late 1980s (Konnert & Wendal, 1988). The Home School Legal Defense Association estimated that as many as 474,000 children were being home schooled as of 1990 (Farris, 1990) and that the growth rate of this movement is between 15% and 40% per year (C. Farris, Executive Assistant, Home School Legal Defense Association, personal communication, April 27, 1994). The most current estimate of the number of children being home schooled is between 700,000 and 1 million (Home School Legal Defense Association, 1995).

However, parents who educate their children at home are often reluctant to be identified due to the rather ambiguous legal nature of home schooling in many states (Furst, 1992). Because of this, exact statistics on the home-school population are difficult to determine. Although the situation is beginning to change, scant research information is available on the home-schooling phenomenon itself until recently (Varner-Groover & Endsley, 1988), although educators are now beginning to pay attention to the home-school movement (Lines, 1994).

Demographic information research on home schoolers presents mixed results. Mayberry (1989) suggests that parents who home school tend to be more educated, more economically secure, and more likely to live in small residential areas of the country. They also tend to be politically conservative and more religious than the rest of the population. Ray (1992), in a profile on home education, suggests that the research indicates that home-school families are about average or a little lower than average in family income, and that the home-school parent has 2 to 3 more years of education than the national average. Home-school families also tend to be larger than average. The national figures suggest an average 1.36 children under age 18 per family, while the home-school population average is three children (Ray, 1992). However, it is uncertain whether this is an appropriate comparison. If family is defined as households with

children, then the comparison is fair. Home-school families, by definition, are households with children. This may not necessarily be the case in the national data's definition of families.

Until recently, research into home schooling has focused on outcomes. The academic progress of home-schooled children was among the first areas to be investigated, and the research has demonstrated the excellence of academic outcomes repeatedly (Alaska Department of Education, 1985, 1986; Ray, 1991).

Another area of emphasis within the early research was how home schooling affected the socialization of children. The results demonstrated the efficacy of home schooling on the self-esteem and socialization of home-schoolers (Kitchen, 1991; Shyers, 1992; Smedley, 1992; Taylor, 1986). This emphasis on outcomes is perhaps understandable for a phenomenon that is seeking to establish itself as a legitimate approach to education. Having determined the efficacy of home schooling, Ray, Mayberry, and Knowles (1992) have suggested the need to broaden the scope of home-school research.

Home schools are perhaps the most under-investigated area of educational research in America. This is presumably due to the increased inconvenience of amassing data from individual home schools and perhaps to the fact that home schooling is often not accepted as a valid educational alternative by many educators. However, since home

schooling is legal in every State and in light of the phenomenal growth of the numbers of children being educated at home, it is important that educators know as much about home schooling as possible.

Statement of the Problem

The home-school population is not only worthy of study in its own right, but it also has the potential of providing a valuable alternative educational group with which to study educational issues in general. This research utilizes the home-school population of Southwest Michigan to investigate the incidence of learning disabilities (LD) within the home-school population. Michigan State Board of Education figures indicate a 4.9% rate of children identified as LD in 1992 (Nuttall & Reed, 1994).

At the same time, it is possible to investigate some of the criticisms of the learning disability field of study. One such criticism of the LD classification is that it is a socio-political concept rather than being a valid educational construct (Gallagher, 1986; Keogh, 1987; Torgesen, 1986). The initial popularity followed by the incredible increase in the number of children identified as learning disabled lends weight to this charge (Tucker, 1980). From 1976-77 until 1989-90, the number of children identified with specific learning disabilities increased 160% (U. S. Department of Education, 1991). In 1976-77, the LD diagnosis accounted for 25% of the special

education population. In a matter of 13 years, that percentage had ballooned to 50% (U. S. Department of Education, 1991). Hallahan (1992) suggests that this explosion of children identified as learning disabled is both understandable and explainable (due to the newness of the field and possible misclassification of LD students into other categories before the advent of LD) and does not bring the concept itself into question. Others disagree and argue that the increase in prevalence is disturbing (Algozzine & Ysseldyke, 1987).

Is the learning disability field powered by socio-political rather than educational concerns? This question is difficult, if not impossible, to answer within the conventional educational system. This is partly due to the fact that special education expenditures per pupil are greater than the expenditures for regular students (Dempsey & Fuchs, 1993), thus, perhaps, providing an incentive for financially strapped schools to identify as many children as possible as being in need of special education services (Dempsey & Fuchs, 1993).

Even when one considers that there are also added costs to the school for providing special education services, if the identification and placement of children in special education categories do benefit the school system, then it becomes difficult for the system to openly examine the construct objectively. However, an investigation of the learning disability construct within a population that

gains no fiscal benefit from identification or placement of children in special education categories (only the benefit of better serving the child educationally) would help to demonstrate the veracity, or lack thereof, of such criticisms. The home-school population provides one such research group.

The validity of the LD construct itself has been challenged within the field of special education (Coles, 1987; Keogh, 1987; Smith, 1991). Factors other than those stated in the definition of LD may be involved in the learning problems of children. Such characteristics may be extrinsic to the subject, such as family attitudes toward education, or intrinsic, such as motivation, learned helplessness, etc. Factors such as these would preclude a diagnosis of LD unless it were determinable that they were the result of neurological dysfunction.

Hargis (1989) has suggested that it is possibly the educational methodology within schools that may be responsible for the increasing number of students having difficulty in their academic efforts. He believes that rather than children having learning disabilities, some learning problems may be the result of an inadequate "fit" between the type of curriculum used in a given classroom and the learning styles or personality of the individual child. This idea has led to the use of the term "curriculum casualty" as an alternative descriptive for students who might otherwise be diagnosed as LD. Hargis (1989) was one of

the earliest to refer to this condition as curriculum casualties. He notes that:

> There is definitely an enormous increase in the number of children being identified as learning disabled. . . . Also, there is increasing evidence that most of the students who are currently being labeled as learning disabled are first and foremost victims of defects in the schools, not in themselves. These normal, but low achieving students are called curriculum casualties. This label, "curriculum casualty," is intended to identify the source of the problem which is in the schools, not in the student or his home. (Hargis, 1989, p. 4)

While it is possible that both curriculum choice and neurological dysfunction are present within such children, Hargis suggests that it is the "system" that is the problem, not the child's ability to learn.

As early as 1936, educators were lamenting the rigidity of most curricular choices (Betts, 1936). In 1946, Betts noted what he called the "lock step" nature of education, which assumed that each child was to learn the same material at the same age as all other children (Betts, 1946). He also suggested that this assumption and practice was detrimental for some children. Many of the roots of the modern home-schooling movement are the result of a rebellion against this "lock step," institutionalized approach to education (Holt, 1969; Illich, 1970; Moore, 1975).

With the well-documented academic success of so many home-schooled children, it is possible that the less "school-like" and/or less structured the curriculum, the better the child is able to learn at his or her own pace

using his or her own particular learning style. The relationship between the structure of the curriculum and LD was explored by this research.

Purpose of the Study

The purpose of this research was to investigate the incidence of learning disabilities within the home-school population. In so doing, the knowledge base on the learning disability construct itself was broadened to include an alternative environment. In addition, this research investigated the concept of "Curriculum Casualties" as an alternative explanation for the diagnosis of LD.

Definition of Terms

For the purposes of this research, home-schooled children are defined as those children who receive the majority of their academic education within the home environment and whose parents are the primary teachers.

Since this research used a sample population from the state of Michigan, the Michigan State Board of Education definition of learning disabilities, R 340.1713, Rule 13.(1) was used:

> "Specific learning disability" means a disorder in 1 or more of the basic psychological processes involved in understanding or in using language, spoken or written which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the

> result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. (Michigan State Board of Education, 1986, pp. 10-11)

This is the same definition as that currently accepted by the federal government (Federal Register, 1977).

The Michigan State Board of Education (1986) also includes within the definition of learning disability the process for determining the presence of learning disability within the individual child. Since this process and the associated criteria for eligibility are used in this study, the regulation is also stated here:

> Rule 13.(2) The individualized educational planning committee may determine that a child has a specific learning disability if the child does not achieve commensurate with his or her age and ability levels in 1 or more of the areas listed in this subrule, when provided with learning experiences appropriate for the child's age and ability levels, and if the multidisciplinary evaluation team finds that a child has a severe discrepancy between achievement and intellectual ability in 1 or more of the following areas:
>
> (a) Oral expression.
> (b) Listening comprehension.
> (c) Written expression.
> (d) Basic reading skill.
> (e) Reading comprehension.
> (f) Mathematics calculation.
> (g) Mathematics reasoning. (p. 11)

Curriculum structure is defined here as the reliance on commercially developed curriculum. Parents who develop their own curriculum through use of library books, encyclopedia, and other information resources, and parents who choose child-directed study approaches to education are considered to be using non-structured curriculum.

Procedures and Design

The research design used herein consists of two phases. The first phase involved the identification of children with some degree of learning problem identified by low levels of achievement. For this study, low achievement is defined as scoring more than one standard deviation (15 standard score points) below the age appropriate mean on any portion of the Wide Range Achievement Test, third revision (WRAT3)--a standardized achievement test.

The second phase consisted of the administration of the Wechsler Intelligence Scale for Children, third revision (WISC-III), a standardized intelligence test, to all subjects who scored more than one standard deviation (15 standard score points) below the mean on the achievement measure. This was to ascertain whether the low achievement level was reflective of a low level of ability, or if some possible learning problem was indicated.

In accordance with standard practice in many school districts (Smith, 1991), a discrepancy formula was used to define the presence of learning problems. A difference of at least 18 standard score points between an individual's achievement score and his or her full scale IQ score was considered indicative of possible learning disabilities. This is the discrepancy figure used by several school districts in Southwest Michigan (Carlin, 1989). Smith (1991) reported that the magnitude of discrepancy needed

for identification of LD by school psychologists in various districts ranges from one to two standard deviations, and that many school psychologists use a one and one-half standard deviation criteria (22.5 standard score points).

Subjects who met the discrepancy requirements for possible identification of LD were then examined for the presence of exclusionary criteria as defined in the Michigan State Board of Education and federal definitions of LD. Exclusion criteria, as specified in law, were intended to exclude from LD designation those students whose symptoms are more probably the result of other factors. These criteria are: visual, hearing, or motor handicaps, mental retardation, emotional disturbance, or environmental, cultural, or economic disadvantage. Subjects who met the discrepancy requirements and were not ruled out by the exclusionary criteria as defined above were considered to have a learning disability diagnosis.

Hypotheses

Since the purpose of this research was to examine the occurrence of learning disabilities in the home-school population and to use the home-school population to explore the veracity of certain criticisms of the learning disability construct, the following hypotheses were examined.

Hypothesis 1

Hypothesis 1 states: Using the Michigan State Board

of Education criteria for determining learning disabilities as closely as possible (Michigan State Board of Education, 1986), less than 5% of the home-school population will meet the eligibility criteria for LD.

Hypothesis 2

Hypothesis 2 states: Subjects identified as LD according to the Michigan State Board of Education criteria will demonstrate characteristics that could be explained by the presence of factors which impact upon the learning process of children that are not ruled out by the exclusionary criteria or absence of "appropriate learning experiences" defined in the LD definition.

Hypothesis 3

Hypothesis 3 states: Learning problems will be found most commonly in the home schools that use more structured curricula.

CHAPTER 2

REVIEW OF LITERATURE

This review of the literature includes a discussion of home schooling and learning disabilities, with specific emphasis on the history, current trends, and relevant research that relates to the interaction between the two topics.

Home Schooling

History

Home schooling is not a new concept. In fact, it is the earliest form of education (Litcher & Schmidt, 1991). It is the conventional public school system that is the educational newcomer.

The roots of the modern home-schooling movement can be traced to work of the education reform movement of the 1960s and 1970s (Knowles, Marlow, & Muchmore, 1992). Educational leaders such as John Holt and Ivan Illich began to question the educational practices of the day, even going so far as to suggest the idea of "deschooling," the abandonment of formal educational institutions in society (Illich, 1970).

John Holt began by criticizing the schools in the late 1960s (Holt, 1969), and subsequently moved ever

closer toward advocating that parents teach their children at home (Holt, 1984). It should be noted that the preceding reference was from Mother Earth News, a "counter-culture," "alternative" publication. This suggests that home schooling was, in its early development, very much a part of the underground culture and was out of the mainstream of society.

During the early 1930s, a growing sense of dissatisfaction with the public school system was noted. The call for reform was voiced loudest by conservative elements of society (Martin, 1991), who saw the decline of the public schools as a result of liberal educational policies of the 1960s and 1970s. Some conservative Christian parents became concerned about the education their children were receiving or perhaps were not receiving. Those parents believed that their children were not adequately educated, and were being taught moral, philosophical, and political precepts that were in opposition to the beliefs of the parents (Gorder, 1987). Also, some parents began to perceive an anti-Christian or anti-religious bias within the public schools (Vitz, 1986). For this reason, some Christian parents began to withdraw their children from public school settings and sought alternative educational settings for their children. Unfortunately, the "flight" of religiously oriented parents removing their children from public schools tended to catch the parochial, Christian educational institutions unprepared to handle the numbers

of children moving from public schools. The unavailability of parochial schools, especially in more rural areas, forced many Christian parents to examine home schooling as a potential alternative to the secular influence of public schools.

Current Trends

From its beginnings in rural America and the counterculture movement, home schooling has slowly worked its way into all areas of American culture and is rapidly being considered as a legitimate alternative to conventional education by a more diverse section of the population. Although it remains very much the least chosen of the educational options in this country, home schooling is one of the fastest growing educational alternatives (Kitchen, 1991). According to Sexon (1988), the home-school movement is a legitimate social movement when considered in terms of the definition of a social movement suggested by Gerlach and Hine (1970). This definition maintains that five factors be present before a true social movement can be claimed to exist: organization, ideology, recruitment, commitment, and opposition. All of these factors have been demonstrated within the home-school movement (Sexon, 1988). While the modern beginnings of home schooling can be found in the counterculture movement of the 1960s (Knowles et al., 1992), it has since moved into the mainstream of American education, even though it is still a

relatively small proportion of the educational scene.

Many home-schoolers are beginning to "come out of the closet," publicly proclaiming their educational choice for their children (K. Slattery, personal communication, June 27, 1994). In February of 1994, the United States House of Representatives voted on a bill (H.R.6) that potentially threatened the right of home-schoolers to educate their children at home. The home-schooling movement was informed of the bill through various channels such as the Home School Legal Defense Association (HSLDA) and "Focus on the Family" (a religious radio program). Home-school participants and others inundated their congressional representatives' offices with telephone calls asking them to ensure the right of parents to educate their children at home. The response was overwhelming (De Nicola, 1994), and the bill was altered to ensure the freedom to home educate without governmental intervention. This demonstrated the political power of the home-school movement (De Nicola, 1994), and indicates that home schooling is no longer a counterculture phenomenon, but rather is a subset of mainstream America.

Knowles et al. (1992) suggest that the history of home schooling can be described in five phases: contention, confrontation, cooperation, consolidation, and compartmentalization (p. 207). Dissatisfaction with the educational status quo led to the contention phase, where some began to look for alternatives to the existing system.

The increased numbers of people choosing alternative educations for their children led to the confrontation phase, where conflicts between home-school parents and public-school administrators arose in the early 1970s. The success of home-schoolers in the courts led to a period of cooperation between school systems and home-schoolers.

Having won the right to home educate their children, a period of consolidation arose in which the movement grew and began to develop networks. Finally, ideological differences have led to the compartmentalization phase of the movement. I conceive the current state of home schooling as being within the consolidation and compartmentalization phases of this paradigm.

While the passage of the amendment to H.R.6 indicates the political power of the home-schooling movement and thus its ability to consolidate resources and present a unified front to the outside world, there is also evidence of home-schoolers becoming factionalized. As the battle for legitimacy and recognition both at the state and federal levels has been won, the home-school movement no longer has a major enemy with which to do battle. As a result, there is more time and energy available to focus on internal ideological differences within the home-school movement itself.

Home-schoolers have been classified, according to their reasons for choosing home schooling, as ideologues

and pedagogues (Van Galen, 1988). Ideologues choose to home school because they believe that in public school their children are being taught values and beliefs contrary to what they believe. Ideologues tend to be conservative Christians. Pedagogues choose to home school because of the belief that home schooling is a better teaching method than conventional classroom learning. These parents tend to be liberal, non-Christian, and often hold New Age beliefs. There is little interaction between the two groups (Knowles et al., 1992).

Another typology for home schooling is that of Mayberry (1989) who classified home-schoolers into four groups: academic, socio-relational, New Age, and religious. These classifications are based on the reasons individuals decide to home school, and are consistent with Van Galen's (1986) categorization of ideologues and pedagogues. However, in Mayberry's (1989) classification, those home schooling for New Age and religious reasons are considered to be ideologues, while those who home school for academic and socio-relational reasons would be considered pedagogues.

Having become the major growth area within home schooling (Knowles et al., 1992), the evangelical, Christian home-school movement has grown to the point where it, too, is beginning to factionalize.

The home-schooling movement can be considered to have grown from its infancy through distinct developmental

stages into adolescence. Now it seeks further legitimacy. In Michigan, under Governor Engler's charter school legislation, many home-schoolers are hopeful that some degree of state funding may enable them to home school their children without financial burden. Some within the movement argue that with government money, government regulation and intervention will soon follow and fear what direction such intervention might take (Smith, 1994).

Criticism of Home Schooling

Home schooling as an alternative educational environment has been criticized by educators for several reasons. First, many professional educational organizations have stated that parents have no teacher training and thus cannot adequately teach their children (Furst, 1992). However, there is no evidence to indicate that teacher certification is correlated with academic outcomes (Furst, 1994; Ray, 1990). In Washington state, home-school parents with less than 1 year of college education are required to take a class in home-based education (Russell, 1994). This was not found to have any effect on the academic outcomes of students (Russell, 1994).

Could other factors such as socio-economic status (SES) or parental education account for the high academic outcome of home-schooled children? Russell (1994) demonstrated that family income did not predict academic outcome, but that parental educational level did. However,

he points out that there is no evidence that this is unique to home-school parents.

Another criticism of home schooling is that children educated at home are not provided with adequate opportunities to learn appropriate socialization skills. This criticism has been shown to be unfounded. The bulk of the research into socialization and home schooling suggests that there is no detrimental effect on the socialization skills or opportunities provided to home-schooled children (Chatham-Carpenter, 1994; Kitchen, 1991; Taylor, 1986). Home-schooled children are usually involved in activities with other children such as community sports, home-school support groups, music lessons, etc., and thus receive opportunities for peer socialization.

While it is clear that home schooling is not something that should be entered into hastily, it would appear that it is both socially and academically appropriate for some children. It has not been shown to be detrimental to the development of children. In fact, it would appear that many children thrive in such a unique educational environment (Chatham-Carpenter, 1994; Kitchen, 1991; Knowles et al., 1992; Ray, 1990, 1991; Taylor, 1986; Van Galen, 1986; Wartes, 1988).

Learning Disabilities

History

Most reviewers of the field of learning disabilities

(LD) trace the roots of LD back to the late 19th century and the works of people such as Bastian and Hinshelwood (Coles, 1987; Hynd, Marshall, & Gonzalez, 1991). Noting that some children exhibited unexplainable difficulties in reading or other academic efforts and yet appeared to be of normal intelligence, the term "congenital word blindness" was coined by Hinshelwood to describe this phenomenon (Hinshelwood, 1904). It was assumed that the cause of "congenital word blindness" was neurological in nature because of the similarity between the behavior of children diagnosed with this problem and adults with brain lesions who also exhibited reading problems (Hinshelwood, 1912). This assumption, that LD is neurologically caused, has been the cornerstone of LD theory ever since (Hynd et al., 1991).

Known by a variety of names, such as strephosymbolia, word amblyopia, reading backwardness, amnesia visualis and others (Drew, 1956), the research into LD was marked by a lack of any unifying theory, terminology, or agreement among the researchers. In many ways, the field of LD research remains divided and unable to agree upon definitions and lacking clear theoretical frameworks (Adelman, 1989; Coles, 1987; Ross, 1977; Sabatino, 1983; Torgesen, 1991, 1986; Tucker, Stevens, & Ysseldyke, 1983; Wong, 1986). Research areas in such an undifferentiated state are said to be in the pre-paradigmatic stage of science (Schultz & Schultz, 1992), in which no clear or commonly

agreed upon explanations for observed phenomena are available. Some special educators and school psychologists are beginning to doubt the existence of LD (Smith, 1991; Tucker et al., 1983). However, LD is presented to parents, teachers, and institutions as a clearly agreed upon and valid explanation of learning difficulties within children (Simmons & Kameenui, 1986).

One prominent historian of the LD field (Weiderholt, 1974) has characterized the history of LD into several developmental phases. These are: foundation (1800-1940), transition (1940-1963), and integration (1963-1980).

The foundation phase consisted of basic research into brain functioning. Although this research does not relate directly to LD, it is included in the history of LD because the basic underlying etiological premise of LD is that it involves neurological dysfunction intrinsic to the child (Bonnet, 1989; Hynd et al., 1991). This premise is the foundation upon which the clinical study of learning problems in children has been based. During the transitional phase, the focus of research was on the understanding of the communication process and the issues involved in the dysfunction of these processes.

At a Chicago conference sponsored by the Fund for Perceptually Handicapped Children in 1963, Samuel Kirk used the term learning disabilities to describe children who exhibited "disorders in development in skills for social interaction" (Kirk, 1963, p. 3). Kirk was not the

first to use this term; it was first used by Thelander in 1958 (Lloyd, 1992; Thelander, Phelps, & Kirk, 1958). However, Kirk's usage of the term is regarded as being the catalyst for popularizing the concept.

Immediately following Kirk's presentation, attendees at the convention voted to organize as the Association for Children with Learning Disabilities (ACLD). This could be considered the birth of the field of learning disabilities (Hammill, 1993), or what Weiderholt called the integration phase of LD history (Weiderholt, 1974).

Since its inception, the field of LD has experienced phenomenal growth. This growth has led to the development of new organizations, massive government funding, a multi-million-dollar-per-year industry in assessment and remediation materials, and a population of children who are being identified as LD in ever-increasing numbers (Dempsey & Fuchs, 1993; Hallahan, 1992; Hammill, 1993).

Definitions of LD

Throughout the history of the LD movement in America, various definitions of LD have been presented (Hallahan & Kauffman, 1988). Perhaps the first attempt at definition was made by Kirk in his textbook Educating Exceptional Children (Kirk, 1962):

> A learning disability refers to a retardation, disorder, or delayed development in one or more of the processes of speech, language, reading, spelling, writing, or arithmetic resulting from a possible cerebral dysfunction and/or emotional or behavioral disturbance and not from

> mental retardation, sensory deprivation, or cultural or instructional factors. (p. 263)

In this definition, LD was "possibly" due to "cerebral dysfunction" or neurological deficit, but could also be due to behavioral and/or emotional disturbance. As the definition moved from an educational to a legal and/or political concern, the etiology was defined more and more as neurological in nature. The federal definition, in 1977, stated that LD does not include children who have learning problems due to emotional disturbance (Federal Register, 1977), and in 1981, the National Joint Committee for Learning Disabilities rejected behavioral problems as a causative factor by stating that both social and emotional disturbances are exclusionary criteria for LD. Their definition states that:

> Learning Disabilities is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions (e.g., sensory impairment, mental retardation, social and emotional disturbances) or environmental influences (e.g., cultural differences, insufficient/inappropriate instruction, psychogenic factors), it is not the direct result of those conditions or influences. (Hammill, Leigh, McNutt, & Larsen, 1981, p. 336, italics mine)

The three most commonly used definitions are the Federal definition (Federal Register, 1977, p. 65083), the National Joint Committee for Learning Disabilities (NJCLD) definition (Hammill et al., 1981), and the Association for

Children and Adults with Learning Disabilities definition (Hallahan & Kauffman, 1988). The most recent attempt at formulating a definition that would be acceptable to all LD organizations resulted in the Interagency Committee on Learning Disabilities (ICLD) (Interagency Committee on Learning Disabilities, 1987) definition. This definition is a modification of the NJCLD definition in order to include the recent trends in LD research, especially the inclusion of social skills deficits as a characteristic of LD (Kavale & Forness, 1992). All currently accepted definitions agree on two things. First, that the disability is intrinsic to the individual and that it is neurological in nature, and second, that the presence of LD can be determined by a discrepancy between achievement and ability.

It is worth noting, as Kavale and Forness (1992) put it, that "the primary conclusion to be drawn about LD definitions is that the more they change the more they stay the same" (p. 14). This statement reflects the frustration some researchers feel about the lack of consensus concerning the definition of LD. Mann, Davis, Boyer, Metz, and Wolford (1983) state that "any consensus on the definition of LD, if indeed one ever existed, has, of course, dissipated since 1971" (p. 16). Even when the definition of LD is agreed upon, McLoughlin and Netick (1983) state that "there is ample evidence that it has not been adhered to by those establishing LD services" (p. 21).

Edgar and Hayden (1985) suggest that a major problem of all definitions of LD is that most of the definitions do not permit quantification. This obviously presents difficulties for the empirical study of LD. The only aspect of LD definitions that is quantifiable is low achievement or, more accurately, severe discrepancy between achievement and ability. Such discrepancy criteria are used by as many as 36 states (71%) (Smith, 1991).

Etiology of LD

The various definitions of LD agree on the major issues such as etiology (which in all definitions is presumed to be an intrinsic neurological dysfunction), and tend to differ on minor points (Tucker et al., 1983) such as whether LD is primarily a childhood disorder or one that affects adults also. Another issue being debated within the LD research is whether or not to include social deficits as characteristic of LD. This type of issue highlights the areas of contention between definitions.

Two recent authors writing introductory historical chapters on LD (Kavale & Forness, 1992; Torgesen, 1991), agree that one of the major problems facing the LD field is that of definition. In many ways, the definition is too broad (Wong, 1986) and too vague (Coles, 1987).

Kavale and Forness (1992) suggest that the major conceptual paradigm on which the definition of LD is based is founded upon the research of Alfred Strauss and Heinz

Werner, which posits a medical model consisting of a neurological dysfunction. It is assumed that because of this dysfunction, academic failure will exist as defined by discrepancy between ability and achievement. This paradigm provided the foundation of the LD field and has not been altered in any significant way to date. In fact, Simmons and Kameenui (1986) investigated the manner in which LD was articulated for the general public through popular periodicals and found that 93% of the articles in 1984 claimed that LD was due to internal (within the child) causes. Seven percent of the articles suggested multiple factors, including minimal brain dysfunction as one of the factors. No articles proposed purely external causes for LD (Simmons & Kameenui, 1986). However, since part of the definition of LD includes exclusion of environmental factors (Federal Register, 1977), this is to be expected.

Bonnet (1989) states that "learning disabilities are multifaceted symptom clusters that result from selective compromise or delay in nervous system development" (p. 16). This assumption is so ingrained into the minds of some researchers that even when the research suggests that LD may be due to external or environmental factors, the concluding statements are quick to point out that no opposition to the neurological paradigm is intended (Lyytinen, Rasku-Puttonen, Poikkeus, Laakso, & Ahonen, 1994).

It has been suggested that five models explain the

etiological factors in LD (Aman & Singh, 1983). These models are:

1. The difference model, in which a percentage of individuals exhibiting learning difficulties are to be expected as one end of a normally distributed phenomenon

2. The deficit model, in which learning problems are associated with neurological dysfunction

3. The delay model, in which learning difficulties are associated with developmental delay

4. The disruption model, in which extrinsic factors such as severe anxiety, depression, and other problems are disrupting the learning process

5. The personal-historical model, in which basic learning skills are not learned because of environmental factors such as disruptive home environments.

Sattler (1992) states that no single model has been able to explain learning disabilities completely and praises Aman and Singh's development of a five-model theory. However, since only the deficit model assumes some degree of neurological deficiency, which is necessary for the identification of LD, the other models broaden the LD construct beyond its definitional boundaries. This broadening of the construct when defining LD appears to be common among researchers and tends to further muddy the waters concerning research into LD.

The only etiological model that presents the

opportunity for an interaction between neurological and extrinsic or environmental factors in the development of LD is Coles (1987). His Interactivity theory of LD implies that the causal factors behind learning problems are complex and difficult to identify. His thesis aroused quite a storm among the LD research community (the Journal of Learning Disabilities dedicated an entire issue to responses to Coles's work), which seems to have become polarized into either/or camps of those who claim neurological etiology of LD or those who believe that LD is at best only a theoretical construct.

Prevalence Rates

Current estimates of the prevalence rates of LD are consistently given at about 5% of the school-age population (Hallahan, 1992; U. S. Department of Education, 1991). Some researchers suggest that over 10% of the population of the U. S. experience pervasive learning disabilities (Bonnet, 1989). It is certainly the largest category of special education, making up approximately 40-50% of all special education placement (Cook-Moats & Lyon, 1993).

Prevalence rates are one of the most controversial features of LD. Tucker et al. (1983) polled experts in the field of special education who responded with prevalence estimates from 1% to 10% of the school-age population. Since the initial identification of LD as a special education category in 1976-77, the number of children

being served under this category has risen 160% (U. S. Department of Education, 1991). This is an incredible increase, especially when one considers that the number of children in all special education categories has increased by about 16% since 1976-77 (Edgar & Hayden, 1985). However, Hallahan (1992) suggests that this increase is predominantly due to the "newness" of LD as a discipline and the possible misidentification of LD students in other special education categories.

Figures for the state of Michigan indicate that the number of children in special education has risen from 147,441 in 1975, to 184,287 in 1993, from 7.10% of the school-age population in 1975, to 11.49% in 1993. However, the number of children in Michigan schools dropped by 22.75% in the same time period from 2,076,184, to 1,603,895. The number of children identified as LD in 1975 was 19,741 (13.39% of the special education population), and in 1993, 78,512 children were identified as LD (42.6% of the special education population) (Nuttall & Reed, 1994). This represents a 397% increase in the number of children identified as LD, while the growth rate for special education was only 25% and the number of children in school actually dropped 22.75% (see Figure 1).

Kavale and Forness (1992) point out that there is no logic or rationale behind the variation in both numbers or percentages of children identified as LD within each state. This may be due to the lack of a standard

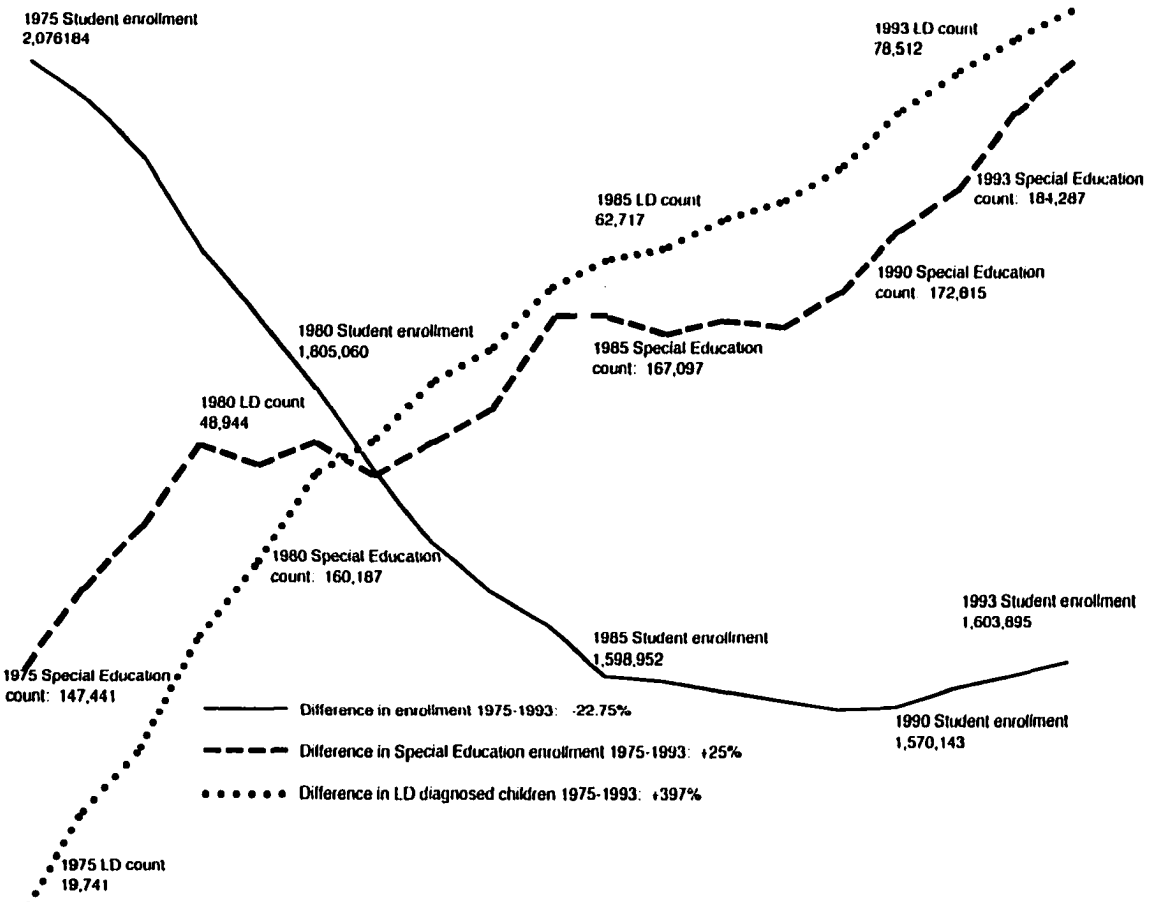


Figure 1. Increase in growth rate of special education and LD students for state of Michigan: 1975-1993.

diagnostic criteria nationally applied definition.

Defenders of LD posit that the problem of prevalence is due to several factors. These include the lack of a precise definition (Kavale & Forness, 1992; Tucker et al., 1983), the "newness" of LD as a discipline (Hallahan, 1992), environmental factors (Bateman, 1992), political factors (Cook-Moats & Lyon, 1993; Gallagher, 1986; Keogh, 1987), financial factors (Dempsey & Fuchs, 1993), and others. However, these reasons are exactly the arguments given by many critics of LD to support the view that LD is not a valid educational or diagnostic criteria (Coles, 1987).

Current Trends

The LD field is currently in a state of flux. This is predominantly a result of the lack of a clearly defined, uniform definition of LD (Adelman, 1989; Coles, 1987; Cook-Moats & Lyon, 1993; Gallagher, 1986). Without a clearly defined diagnostic definition of LD, research becomes difficult to replicate. As one author put it:

> I believe that if we continue trying to define learning disabilities by using ill defined concepts, we will forever be frustrated, for it is an elusive concept. We are being bamboozled. It is as though someone started a great hoax by inventing the term and is then tempting others to define it. And lo and behold scores of task forces and others have taken the bait. (Lovitt, 1978, pp. 6-7)

Many studies involve school-identified LD students as subjects. This presents a problem because different states, and in fact different school districts within the

states, have varying criteria for identifying LD students (Gallagher, 1986; Mann et al., 1983; Torgesen, 1986; Ysseldyke, Algozzine, Shinn, & McGue, 1982). This has become so problematic that the Council for Learning Disabilities has recently called for more stringent standards for subject inclusion in LD research (Rosenberg et al., 1994). Another trend in LD is to include social-skills deficits among the diagnostic criteria of LD (Interagency Committee on Learning Disabilities, 1987; Vaughn, 1991). Evidence suggests that factors within the home environment correlate with the presence of LD (Green, 1990; Perosa & Perosa, 1982) and that many LD children have social-skills deficits (Vaughn, 1991; Wilchesky & Reynolds, 1986).

Finally, there is an increasing body of literature calling for the formation of new paradigms to understand and explain LD. Torgesen (1986) suggested that three paradigms be developed to explain LD: (1) neuropsychological (which seeks to explain behavior in terms of brain systems), (2) information processing (which is concerned with how information is stored, processed, and retrieved by the brain), and (3) applied behavioral analysis (which views behavior in terms of observable relationships between stimuli and responses). Unfortunately, using current definitional standards, only the neurological category can actually be called LD. Adelman (1989) proposed a classification scheme that differentiated LD from other learning problems. His scheme consists of four "Types"

that define the severity and perhaps even etiology of the learning problem.

Type I learning problems are at the mild end of the continuum. These are the children whose learning problems are predominantly the result of external, environmental causes.

Type II learning problems are found in those children who may have some internal factors predisposing them to problems in learning. Such children are predisposed to learning problems, but will not demonstrate a learning problem unless environmental factors such as stress trigger the predisposing factor(s).

Type III learning problems are the more serious of the learning problems and are presumed to be the result of neurological malfunction of some kind. These would be considered LD.

Type IV learning problems consist of those that are the result of the presence of other disorders or handicapping conditions. These would not be considered LD.

Such a typological paradigm seeks to maintain the integrity of the LD construct while at the same time allowing for other, non-LD problems in learning. Labeling all learning problems as LD, rather than acknowledging a variety of causative factors for such difficulties, would account for the definitional and research replication difficulties that are so pervasive within the LD field. However, only children identified as LD are eligible for

special educational funding (Coles, 1987; Dempsey & Fuchs, 1993), and thus there would be little incentive for schools to adopt Adelman's (1989) paradigm. In fact, there may be some degree of financial disincentives that function to keep the traditional LD construct firmly established within educational circles. Dempsey and Fuchs (1993), in their analysis of reimbursement formulas for special education, noted an increase in the number of children being placed in more severe special education categories when a "weighted" reimbursement schedule (in which the school receives more funding for more severely impaired children) was used to determine funding.

Criticism of LD

It is believed by some that much of the impressive growth of the LD movement has been due to the politicization of the field (Biklen, 1988; Gallagher, 1986). In fact, some researchers have suggested that political advocacy has propelled the field beyond the ability of the scientific research to "back up" the political claims (Cook-Moats & Lyon, 1993). Cook-Moats and Lyon (1993) even state that no empirical or clinical validation of the LD construct has been possible.

Even the decisions about who is placed in special education with the diagnosis of LD are often political and often have more to do with money than with the needs of the children (Dempsey & Fuchs, 1993; Sabatino, 1983). One

investigation of the differences between LD children and "slow learners" failed to distinguish any characteristics or variables that distinguished the two types of students (Ysseldyke et al., 1982).

Edgar and Hayden (1985) suggested that

> there is no argument that all children who are experiencing difficulty in school should receive prompt and appropriate services. The critical question is who should be classified as handicapped and served by special education and who should be served by regular education?
>
> An intellectually honest approach is to identify the 2% with quantifiable handicaps; accept a reasonable percent (2%) for speech-only handicapped children; and then predetermine a further percentage of the total school-age population defined as low achieving who will receive assistance by special education and another (higher level) group to receive additional services (remedial programs) from regular education. This approach would have several important outcomes. It would: (1) save educators from having to categorize children into nonfunctional categories; (2) acknowledge the futility of the child category model for this population; (3) be consistent with Congress's intent in passing PL94-142; and (4) place the major responsibility for educating these children where it belongs-with regular education. (p. 536)

The implication here is that much of what is diagnosed as LD is more of an educational or political expediency than a valid diagnostic criteria.

Sabatino (1983) suggested that longitudinal studies of LD adults indicate two distinct populations: those who failed to "catch up," whom he calls underachievers, and those who fail to "catch on," which he calls "brain different." He then goes on to voice his frustration about the term LD by concluding that "in my humble opinion, this term will not survive; the concept may if something

serious is done, and soon" (p. 27). It would appear that his concern has gone unnoticed.

Kirk and Kirk (1983) voiced similar concerns:

> The field of learning disabilities is somewhat nebulous. If it is going to coalesce into a unified body of theory and practice it will have to recognize that . . . "problems resulting from poor teaching, emotional disturbance, poor school attendance, etc., are not directly due to learning disabilities. . . . The LD specialist is concerned with intrinsic, not extrinsic, bases of the problem. (Kirk & Kirk, 1983, p. 21)

Some researchers believe that the evidence for neurological dysfunction, or "minimal brain dysfunction" as a basis for distinguishing LD from other learning problems, is merely correlational at best (Torgesen, 1991) and is quite equivocal (Coles, 1987).

Outcome studies of LD placement suggest that there is little benefit to the individual who is placed in this special education category (Caccamo, 1985; Spreen, 1988). In fact, Caccamo (1985) states that

> there appears to be a significant inability to rehabilitate these youngsters. It would appear that we are teaching L.D. youngsters to be dependent and that the traditional pull-out or resource framework of intervention for these students has only limited effectiveness. . . . After several years of closely monitoring the improvement of reading performance among the learning disabled students, we have found that very few students show significant improvement. (p. 6)

Gerald Coles (1987) suggests a new paradigm that completely redefines the field of LD. In his interactivity theory, he posits that LD as it is currently defined and used in professional circles does not exist. While admitting that there are perhaps a small number of children who

exhibit clear neurological deficits that impact upon their learning ability, he holds that the bulk of children currently diagnosed as LD are experiencing learning difficulties that are the result of the interactivity between the individual and various intrinsic and extrinsic aspects of his or her environment:

> An interactivity theory of LD combines the concepts interaction and activity. Interaction emphasizes processes, relationships, and transformations, but insufficiently denotes activity. Activity emphasizes events and active persons, including the makeup of persons (such as neurology, language and reading abilities, motivation), but insufficiently denotes interaction. Interactivity, in combining the concepts, denotes the numerous and complex activities and interactions that comprise the creation, sustenance, remediation, and prevention of learning disabilities. (Coles, 1987, p. 140)

For some, the problem may be the home environment, for others it may be that the teacher is not reaching the child for a variety of possible reasons:

> Although interactivity has many combinations, a basic assumption of the theory is that broad social, economic, political, and cultural influences, which are not always immediately apparent, are fundamental to the creation or prevention of LD. This does not mean that these broad influences by themselves "determine" LD; it does mean that they are inseparable from all activities and interactions that are a part of LD. (Coles, 1987, p. 140)

Unfortunately, the current definition of LD precludes any explanation that is not purely neurological in nature and intrinsic to the child.

Critics of Cole's theory focus on the fact that it more clearly explains general learning problems than specific learning disabilities (Torgesen, 1991); but this is

exactly the point that Coles intends to make. For others it may be that "Curriculum Casualties" would be a more accurate diagnosis (Jones-Pacholski, 1989). Since this concept figures significantly in the study reported herein, it is developed further in the following section.

Curriculum Casualties

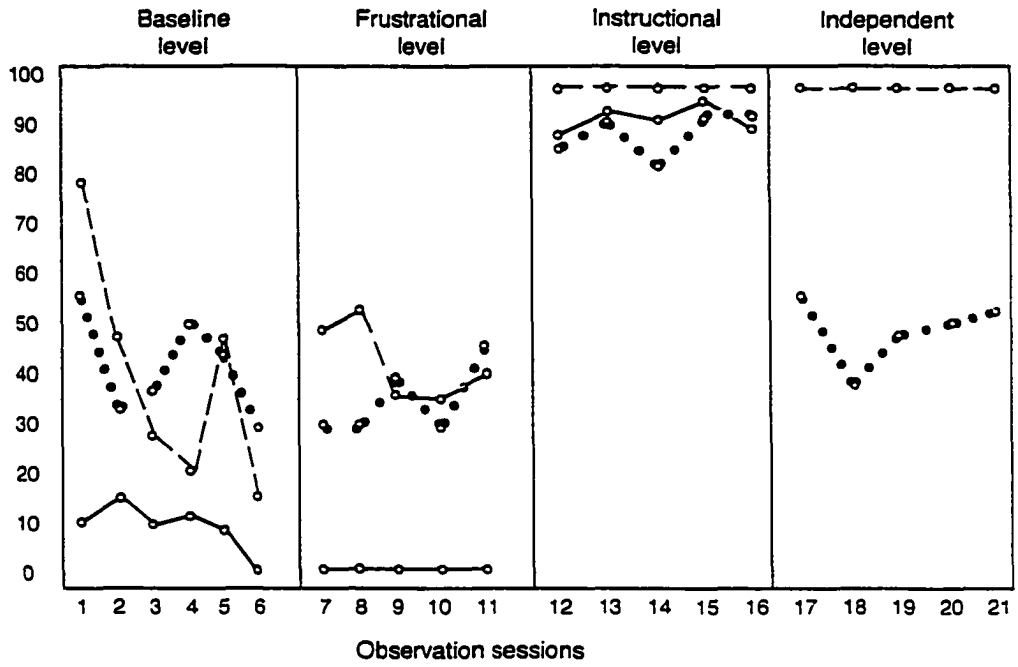
Curriculum casualties refers to the possibility that it is the curriculum or the way the curriculum is presented to the child that is the reason for the child's learning problems. Gickling and Armstrong (1978), in their classic work on instructional difficulty as a factor in the child's learning problem, demonstrated that the difficulty of the material being presented to the child would affect the way the child responded not only academically, but also behaviorally.

Three levels of instructional difficulty were used by Gickling and Armstrong. These levels were obtained by developing a pool of known, hesitant, and unknown information from baseline observation of the subjects: 1) the frustrational level, in which less than 75% of seatwork material and less than 90% of reading material are understood and known by the child, 2) the independent level, in which more than 90% of the seatwork material and more than 97% of the reading material are understood by the child, 3) the instructional level, in which between 70-85% of the seatwork material and 93-97% of the reading material are

known and understood by the child (see Figure 2).

At the frustrational level of instruction (less than 75% of seatwork material is known by the child and less than 90% of the reading material), the children in the study demonstrated between 40-60% on-task behavior and task-completion, but only 20-35% task-comprehension. In other words, they had generally performed their assignments, they had (for the most part) done the work, but did not understand what they were doing.

When instructional difficulty levels were adjusted by the experimenters to the independent level (more than 90% of seatwork activity and more that 97% of reading activity are known by the child), the task-completion and task-comprehension rates were at 90-99%, while the on-task behavior rate remained at levels between 50-60%. When the level of instruction was manipulated to be at the instructional level (between 70-85% known elements for seatwork and 93-97% known elements for reading), the children performed at levels of on-task behavior, task-completion and task-comprehension at levels above 80% (Gickling & Armstrong, 1978). What does this have to do with LD? The levels of instruction have been demonstrated to affect the ability of a child to learn the material he or she is required to learn. If the level of instruction is the culprit for the student's learning problem then, by definition, the child cannot be considered to be LD. Of course,the individual personality of each child will



Mean Percentages of On-Task Behavior (————), Task-Completions (••••••), and Task-Comprehension (— — —) per Session on Baseline, Frustrational, Instructional, and Independent Levels of Function.

Figure 2. Effects of instructional material difficulty on child's performance and behavior. Adapted from "Levels of Instructional Difficulty as Realted to On-task Behavior, Task Completion, and Comprehension," by E. E. Gickling and D. L. Armstrong, 1978, Journal of Learning disabilities, 11(9), p. 36. Adapted with permission.

affect the extent to which any factor will impact upon his or her ability to learn.

Most home-school parents are not certified teachers. Because of this, it is possible that the curriculum choices of the parents are not conducive to the student's learning style. Some parents attempt to counter this difficulty by purchasing packaged curricula and following the curriculum guides provided by the publisher.

One public-school teacher quoted in Charvoz (1988) indicated that reliance on curriculum guides, both within the home-school environment and in the public schools, was unproductive and may have a negative impact upon the quality of education a child receives:

> I wonder at parents relying on curriculum guides and thinking that the authors of the guides have a complete understanding of how their children learn. I think it is important for parents to realize that they are the ones giving the [information] to their children and that they can see the best way to teach them. This is an important concept for public school teachers to remember also. (Charvoz, 1988, p. 93)

Van Galen (1988), in her description of home-schoolers, indicated that home-schoolers varied in the type of curricula used and in the manner in which any particular curriculum was utilized. One method of home schooling was described:

> In these families, as in many classrooms, the day is structured around textbooks and workbooks that the parents frequently purchase as a grade-level package. The publishers of these materials provide both the materials and the directions for their use. The parents perceive their role to be that of monitors assisting their

> children toward attainment of goals defined by the curriculum suppliers. Typically, the children in these families work independently on structured paper and pencil tasks, with the parents stepping in only if the child encounters some procedural difficulty. (Van Galen, 1988, p. 58)

Such heavy reliance on structured curricula forces the student to fit the curriculum rather than the curriculum to fit the student's particular needs. Children who fail to conform to the demands of such a structured curriculum may begin to exhibit difficulties with their learning, either because the learning process becomes dull and uninviting, or because they begin to struggle with trying to learn in a manner that is not appropriate for their particular style. Such children could become identified as LD when, in fact, it is the curriculum that may be the problem, not the student's ability to learn.

Federal guidelines for LD diagnosis recognize the importance of appropriate educational experiences. P.L. 94-142 (section 300.541) stipulates:

> A team may determine that the child has a specific learning disability if . . . the child does not achieve commensurate with his or her age or ability levels in one or more of the areas listed in Paragraph (A) (2) of this section, when provided with learning experiences appropriate for the child's age and ability levels. (p. 53, italics mine)

Regulation 300.543 of P.L. 94-142 also assumes that the educational experience of the student should be examined and adjusted before a special education placement can take place,

> whether there is a severe discrepancy between achievement and ability which is not correctable without Special Education and related services. (p. 54, italics mine)

There is evidence to suggest that these regulations are often forgotten when evaluating for special education placement (McLoughlin & Netick, 1983).

The question then arises: How does one tell the difference between the true LD child who has presumed neurological deficits and the child who simply is struggling because of the level of instructional difficulty? This is the question that the LD or special education specialist is supposed to answer when asked to evaluate a child and make recommendations for the IEP (Individual Educational Plan). However, there is evidence that this is often neglected due to the difficulty in achieving such goals (Ysseldyke et al., 1982).

LD and Home Schooling

An intensive review of the literature on home schooling suggests that there has been virtually no research to date on the subject of LD within the home-school population. A review of such databases as Psych Info, Educational Resources Information Center (ERIC), and Dissertation Abstracts produced no references.

The only reference in the literature that was found to have anything to do with special education needs among home-schoolers was a survey of Washington state home-schoolers asking if they were aware of the type of public

school services available to home-schoolers and whether or not they would use each type of service. Of those surveyed, 12.5% claimed they would use special education services if available (Ray et al., 1992). However, it is not known how many of these respondents would actually need special educational services. It is only stated that they would use them if they needed them and if the services were available. It is also impossible to determine how many of the respondents would have children who are LD as opposed to other special education categories.

Until recently, little mention of LD was heard within the home-school community except in individual cases. However, a recent review of the conference and workshop titles from several home-schooling conventions indicates that LD is becoming an issue within the home-school community (Hunter, 1994a, 1994b; Ringger, 1994). At this time, there is little or no evidence that home-schoolers have similar LD rates or needs as those found within the conventional educational system.

CHAPTER 3

METHODOLOGY

This study sampled 298 home-schooled children in Southwest Michigan in an effort to determine the prevalence of LD within the population using the Michigan State Board of Education criteria for LD (Michigan State Board of Education, 1986). A convenience sample was gathered using the mailing lists of several home-school organizations within the area (Dowagiac Area Home Schoolers, KAHSA, Konos Cooperative Schools, Lakeshore Christian Home School Cooperative, L.I.F.E. [Cassopolis], Michiana Christian Educators, Portage/Schoolcraft/Vicksburg Support Group, Twin Cities Scholars, and Van Buren County Homeschoolers). Participants were also requested to network with others who might be interested in participating in this study, and several subjects were procured in this way. This chapter describes the subjects, instrumentation, procedures, and the manner of data analysis.

Subjects

The subjects in this study consisted of home-school children between the ages of 6-16 (mean age of 9) who have been home schooled for at least 1 year (mean of 3.7 years, range 1-10). Parents were also asked to complete a

survey/questionnaire form for each child (appendix B).

Instrumentation

Wide Range Achievement Test, Third Revision (WRAT3)

The WRAT3 consists of three subtests: reading, spelling, and mathematics, which evaluate the achievement levels of children on three vital academic skills.

Reliability coefficients for the WRAT3 subtests are given by the publishers (Wilkinson, 1993) as .91 for the reading and spelling subtests and .86 for the arithmetic subtest. Test-retest reliability indices range from .91 to .98. These coefficient scores suggest that the WRAT3 is a reliable measure of a child's achievement in these three core areas. Content validity of the instrument is excellent, and the evidence for construct validity is more than adequate (Wilkinson, 1993). The test is approved as a screening tool by the Michigan State Board of Education (Michigan State Board of Education, 1986). Christopher et al. (1986), in a discriminant analysis of variables affecting LD placement, demonstrated that the WRAT-R (the precursor to the WRAT3) was one of the best predictors of LD identification when combined with a measure of intelligence.

Wechsler Intelligence Scale for Children, Third Revision (WISC-III)

The WISC-III is the revision of the WISC-R, one of a series of intellectual assessment tools developed by David

Wechsler. The Wechsler scales are among the most highly regarded intellectual assessment tools used by psychologists.

The WISC-III consists of 13 subtests which, when combined, compose two measures of intellectual capacity: verbal and performance IQ scores. These are then combined to provide an assessment of the subject's total intellectual performance, the full scale IQ score. The subtests are as follows: Information, Similarities, Arithmetic Vocabulary, Comprehension, Picture Completion, Coding, Picture Arrangement, Block Design, Object Assembly, Digit Span, Mazes, and Symbol Search. The first 10 of these subtests comprise the main instrument. The remaining three, Digit Span, Mazes, and Symbol Search, are considered to be supplementary tests. Digit Span can supplement the verbal score and Mazes is used to supplement the performance score. Symbol Search is used as a substitute or supplement to the Coding subtest only. These supplementary tests are not used to determine the IQ score of the individual, but are of clinical utility. Factor analysis of the instrument suggests four main factors: Verbal Comprehension, Perceptual Organization, Freedom from Distractibility, and Processing Speed. Since the aim of this research was to determine the presence of LD within the home-school population, 12 of the 13 subtests were used. The Mazes subtest is not used in scoring either the verbal, performance, or full scale IQ scores and is not

required to score the individual's performance on any of the four factors. Thus it was not used in any of the assessments.

Reliability coefficients for each of the individual WISC-III subtests range from .69 on object assembly to .87 on the vocabulary and block design subtests (Wechsler, 1991). Reliability coefficients for the verbal, performance, and full scale scores are .95, .91, and .96 respectively (Wechsler, 1991). Validity data provided in the test manual (Wechsler, 1991) suggest that there is adequate validity for this instrument. Factor analytic evidence as well as correlations with other measures provides support for the construct validity of the instrument.

The predecessors of both the WISC-III and the WRAT3 (WISC-R and WRAT-R) have been demonstrated to be the best predictors of LD placement (Christopher, Giuliani, Holte, Beaman, & Camp, 1986). Thus, the measures used in this design are consistent with the existing research knowledge in this field for assessing the prevalence of LD.

Survey/Questionnaire Form

A survey/questionnaire form was developed (appendix B) to be administered to the parents of the subject children. This form elicits demographic information and also surveys the educational procedures such as grade levels last worked at, the type of curriculum used, number of hours per day spent in school, etc. Participation in

home-school groups was assessed, as was participation in extracurricular activities. The parents' understanding of the child's learning patterns, likes and dislikes, and other variables were addressed in this survey. Questions were also asked concerning the child's vision, hearing, and emotional state in order to evaluate the existence of LD exclusionary criteria (Michigan State Board of Education, 1986).

Procedures

Participants were obtained by mailing letters to parents who were members of various home-school groups using the home-school group mailing lists. Each mailing included a letter of introduction explaining in general terms the nature of the study and the requirements for participation, a copy of the informed consent form, and a postcard to be returned if they chose to participate in the study (appendix B). Five hundred seventy letters were mailed to known home-school families, and 148 families responded (a response rate of 26%). Eleven families who responded were unable to participate either because they did not meet the requirements for participation or could not participate within the time frame allotted. Some of these families lived in Indiana; some had not been home schooling for a full year. Thus a total of 137 families represent the sample used in this study.

I was known to a small percentage of the mailing list

(7.5%). A response rate of 86% was achieved among this portion of the mailing list. This group of respondents has been analyzed separately to determine the possibility of sample bias.

Parents who returned the initial contact postcard were contacted by phone to arrange an appointment to administer the initial screening tool--the WRAT3--and the parents were asked to complete a questionnaire/survey form (appendix B) for each child at this time. It was explained to the parents that some children would be contacted later for a second, more exhaustive assessment, but the reason for this second visit was not explained. After administering the WRAT3, the parents were provided with an oral summary of their child's achievement levels.

Families with children who scored more than one standard deviation below the mean for their age (standard score of 85 or less on any of the three WRAT3 subtests) were contacted again, and a time was arranged for the administration of the WISC-III. The parents of these children were provided with general information concerning their own child's intellectual performance after the WISC-III had been scored. Furthermore, recommendations were made available to the parents concerning things such as the child's preferred learning styles, abilities, strengths, and weaknesses.

Determination of LD

Subjects were first identified as experiencing

academic difficulty by their performance on the WRAT3 achievement test. Those who scored more than one standard deviation (15 standard score points) below the mean on one or more of the three subtests were identified as possibly LD (n = 54). These individuals were then administered the WISC-III to determine cognitive ability.

Subjects who demonstrated a discrepancy of less than 18 standard score points (n = 12) between ability and achievement levels were dropped from the list of those subjects identified as possibly LD. It was assumed that these individuals did not demonstrate a large enough discrepancy between achievement (as measured by the WRAT3) and ability (as measured by the WISC-III Full Scale IQ) to meet the "severe discrepancy" criteria of LD definition (Michigan State Board of Education, 1986). Although the precise cutoff point may differ from school district to school district, the use of discrepancy cutoffs is standard procedure in most school districts. Eighteen points was chosen as a conservative cutoff point and is consistent with local educational practices (J. Carlin, personal communication, December 3, 1993). It is also within the range of discrepancy size utilized by many school psychologists (Smith, 1991).

The remaining subjects (n = 42) were then screened for economic disadvantage by dropping those whose family earned less than $20,000 ($n$ = 5). These individuals were dropped in order to rule out the possibility of economic

disadvantage, which is one of the exclusionary criteria in the LD definition (Michigan State Board of Education, 1986). Three of the five excluded subjects lived in homes where the family income was less than $10,000; the remaining two subjects lived in homes where the family income was between $10,000 and $19,000. Data on the demographic form indicated income in $10,000 increments and so there was no way to differentiate families making $11,000 from those making $19,000. Because of this, in order to exclude children with economic disadvantage, $20,000 was used as the cutoff criteria for this study.

There is some question as to whether this criterion is routinely assessed by school psychologists. In fact, when contacted by me, individuals at the Michigan State Board of Education were unable to provide guidelines or cut-off figures for the determination of economic disadvantage.

Subjects were also screened for the possibility that they had not received formal education in the content area in which they were experiencing low achievement. This was done in several ways. First, the curriculum survey for each subject was examined to determine if any curriculum was used for the content area and also to determine that the content area was being taught. Thirteen subjects were excluded because the curriculum survey indicated that these individuals were not receiving instruction in the subject area they were low achieving in.

Second, those who were taught for less than 2 hours per day were excluded from the group of possible LD subjects (n = 17). It is not likely that all academic subjects can be effectively taught in less than 2 hours per day.

Finally, those subjects whose parents were following a delayed academics educational philosophy[1] were excluded (n = 6) since there was no way to determine the impact of such a philosophy on the educational performance of the student. However, it should be noted that every student following the Delayed Academics philosophy required the administration of the WISC-III. Attempts were made to screen for vision, hearing, or emotional problems, although none of these had an effect upon the academic performance of any individual. Other exclusionary criteria included abuse/neglect (n = 1) and speech problems (n = 1).

These measures are in accordance with the exclusion

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[1]The delayed academics philosophy of Dr. Raymond Moore states that children are not developmentally ready for formal academic training at ages 5-6, the age that most children begin school. He believes that children are not developmentally ready for school until the ages of 8-10. Because of this, he suggests that (1) children be delayed in the starting of formal academics until the age of 8 and (2) because they will then be developmentally better prepared for formal academics, they will rapidly catch up to their peers and will, in fact, achieve at higher rates than other children because they have not been frustrated by being expected to perform cognitive and intellectual tasks at levels where they were unprepared to succeed.

ary criteria stated in the Michigan State Board of Education definition of LD:

> The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. (Michigan State Board of Education, 1986, pp. 10-11)

They also meet the requirement of P.L. 94-142, the Education for All Handicapped Children Act, regulation 300.541. Some subjects were included in more than one exclusionary criteria and so the number of children being dropped at each stage does not correspond with the number of subjects still identified as possible LD students. All remaining subjects (n = 11, 3.7%) were considered to be potentially diagnosable as LD.

Data Analysis

The first two hypotheses required no statistical procedures since they involve prevalence data. Hypothesis 1 states that this study will follow the Michigan State Board of Education criteria for LD "as closely as possible." Because of this, the results are presented by using a strict interpretation of the criteria. However, it could be suggested that some school psychologists do not follow the ruling that children must have been exposed to learning experiences appropriate for their age and ability levels. This is understandable. It would be easy to assume that if a child has attended school without interruptions or major problems, then the child has received

access to appropriate educational experience.

Therefore, there is a risk that in following the Board of Education criteria too closely an unfair comparison between the exclusionary criteria could exist between the prevalence rate of this study and that of the public schools. Because of this, hypotheses 1 and 2 are also evaluated without including the educational experiences of the child being used as exclusionary criteria. Hypothesis 3 was tested using chi-square, non-parametric correlational statistical procedures. The chi-square distribution is used to determine how well an actual set of observations "fits" a theoretical, or expected, set of observations. It is adequate for nominal and ordinal data such as the data gathered in this study.

CHAPTER 4

RESULTS

This chapter examines the results of the research in two ways. First the statistical or empirical observations from the research are discussed. Second, some non-empirical observations from the assessment process and interaction with parents are reported.

In this chapter, it is necessary to distinguish between learning problems and LD. Learning problems, as used in this chapter, refer to those learning problems that exist but are not clearly identifiable as LD. Individuals who score at or below the standard score of 85 on any of the three WRAT3 subtests are assumed to be experiencing learning problems.

Empirical Data

Three hundred eight home-schooled children from 137 families participated in the study. Ten children chose not to participate in the second phase of the study (administration of the WISC-III) and so those families were dropped from the study leaving a sample group of 298. Reasons given for not completing the research were predominantly scheduling conflicts.

The children not requiring administration of the

WISC-III (n = 244) were ages 6 to 16 (mean 9.87), spent a mean of 3.54 hours per day in school work, and had been home schooled for a mean of 3.72 years. The median family income was $45,000.

Fifty-four children (18%) met the requirements for administration of the WISC-III. Assuming that achievement is normally distributed within the home-school population, 16% could be expected to score in the below average range of achievement. The mean age for the group requiring a WISC-III was 9.04. The mean school day was 3.20 hours, and students had been home schooled for a mean of 2.90 years. The median family income for this group was $25,000. The average age and median family income were both significantly different between the two groups when using chi-square statistical analysis, with income being significant at the 0.001 level (Figure 3). This suggests that there are real differences between low achieving and non-low achieving children, which may or may not impact upon their academic ability. The family income of children having learning problems was lower than that of children with no learning problems. The average age of children in the learning problem group was younger than that of the group with no learning problems. This was significant at the 0.05 level of significance (Figure 4). Of these 54 children with learning problems, 42 (14% of the original sample) met the severe discrepancy criteria for LD.

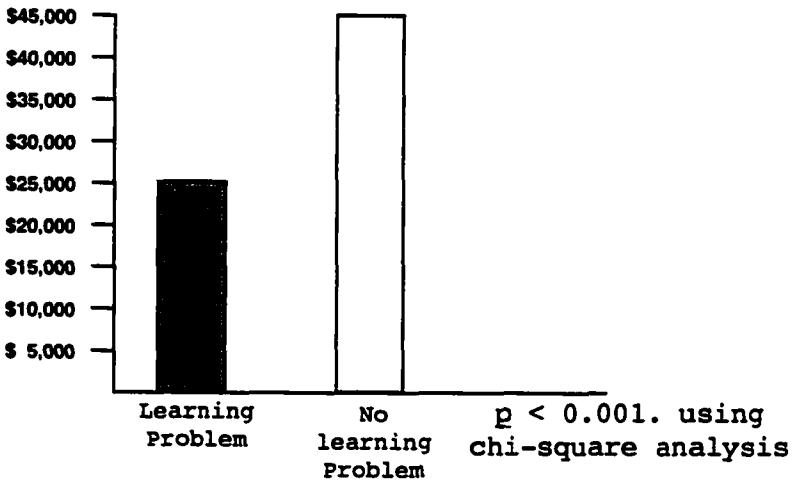

Figure 3. Median income for learning problem and non-learning problem group.

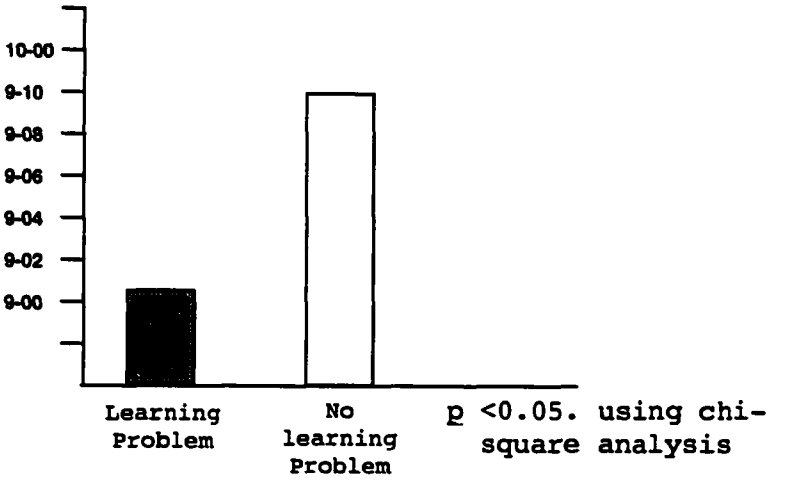

Figure 4. Average age for learning problem and non-learning problem group.

Of the 137 families who responded to the question about why they chose to participate in the study, 21.16% (n = 29) stated that they were aware of a possible learning problem with one or more of their children and wanted to receive the testing to determine the presence or absence of such problems. Since the entire sample group represents only 26% of the original mailing, analysis was performed on the participants who knew me by name or reputation within the home-school population in order to determine if there was any sample bias present in the sample group.

Of the portion of the mailing list (approximately 7%) to whom the researcher was known, 86% participated in the study. Only 16% of these participants chose to participate because of a concern about learning difficulties within their children. Chi-square analysis of the two groups (knowing the researcher versus not knowing the researcher) indicates that this is not a significant difference.

Hypothesis 1

Hypothesis 1 states: Using the Michigan State Board of Education criteria for determining learning disabilities as closely as possible (Michigan State Board of Education, 1986), less than 5% of the home-school population will meet the eligibility criteria for LD.

This hypothesis is not supported. Although only 3.7%

(n = 11) of the sample group demonstrated a severe discrepancy between achievement and ability, which could not be accounted for by the exclusionary criteria or lack of appropriate learning experiences, this difference was not statistically significant when using chi-square to examine the difference between population and sample percentages.

Of the original 298 subjects who participated in the study, forty-two subjects (14.1%) demonstrated a discrepancy of at least 18 standard score points between achievement and ability measures. From these subjects, 23 were dropped because of low SES, spending less than 2 hours per day in formal educational experiences, or not using some form of curriculum for the content area in which they were not achieving. This left a group of 19 (6.4%) potentially LD subjects (see Table 1).

Examination of the remaining 19 subjects indicates that 8 demonstrate other factors that would, by regulation, exclude them from a diagnosis of LD until the educational impact of such factors could be determined (see Table 1). Speech problems are a separate special educational category, thus this subject was excluded from the possibility of an LD diagnosis. Therefore, 8 of the 19 subjects were dropped from consideration for a possible diagnosis of LD, leaving a potential 11 subjects (3.7%) who might be considered to have a learning disability.

Table 1

Number of Children Excluded From LD Diagnosis by Criteria

Exclusionary criteria	No. of cases
Discrepancy < 18 points	12
Low SES	5
No Curriculum	7
< 2 hours per day	11
Delayed academics	3
Subject area not taught	3
Speech problems	1
Abusive childhood/adoption	1

When the Board of Education criteria are used as they are typically used by school psychologists, such criteria as delayed academics and the lack of appropriate teaching of curricular areas would not be considered. Therefore, given typical application of eligibility criteria, it is quite possible that hypothesis 1 would not be supported since 11.7% (n = 35) of the sample group might be diagnosed as LD under public-school conditions.

Summary Statement

Hypothesis 1 is not supported. The difference between the public-school and home-school LD prevalence rates is not statiscally different.

Hypothesis 2

Hypothesis 2 states: Subjects identified as LD according to the Michigan State Board of Education criteria

will demonstrate characteristics that could be explained by the presence of factors which impact upon the learning process of children that are not ruled out by the exclusionary criteria or absence of "appropriate learning experiences" defined in the LD definition.

Eleven children demonstrated learning problems that were not ruled out by the use of exclusionary criteria presented in the State Board of Education definition. Examination of the survey/questionnaire form provides no further reasons for the learning difficulties displayed by these children. Parental attitudes toward home schooling, child attitude toward school tasks, traumatic life experiences, and other factors were examined using the survey/questionnaire. Responses to questions such as Does your child like school? How much do you like to teach? Has your child's vision ever been tested? Has your child's hearing ever been tested? Has your child ever been in counseling? provided no evidence to suggest that any of these factors were indicated in the learning diffiulties of the remaining LD children. Because of this, hypothesis 2 is not supported.

Of the 11 subjects with unexplained learning problems, 63.64% (n = 7) exhibited low achievement in the spelling portion of the WRAT3. On the math portion, 9.09% (n = 1) exhibited low achievement. No subjects exhibited low achievement on the reading portion, and 27.27% (n = 3) exhibited low achievement on more than one portion of the

WRAT3. No data from the instruments used in this study could identify further possible reasons for the presence of learning difficulties.

Summary Statement

Hypothesis 2 was not supported. The instruments used in this research design were unable to indicate further possibilities for the presence of LD in the sample group.

Hypothesis 3

Hypothesis 3 states: Learning problems will be found most commonly in the home schools which use more structured curricula.

Hypothesis 3 is not supported. A relationship was noted between teacher involvement and learning problems, but not in the structure of curriculum as was originally hypothesized.

Of the 10 core-curriculum subjects (geography, handwriting, language arts, math, science, vocabulary, writing, social studies, and spelling) that were examined for this study, only 2 of the 10 (geography $p < .001$, and language arts $p < .05$) were found to be significantly different between the learning problem and non-learning problem groups.

Curriculum choices from the survey/questionnaire form were categorized into structured or non-structured. Commercially purchased curricula such as complete curricular packages and textbooks were considered to be structured

(Paces, Textbook/workbook, and teacher lecture were considered to be structured curriculum). Curricula developed by the parent through use of library books, encyclopedia, and other information sources, and the use of no curriculum or child-directed methods were considered as non-structured (no curriculum, child directed, and teacher developed with and without assignments were considered to be non-strctured). A chi-square analysis of the curriculum choices of the learning problem and non-learning problem group indicates that there is not a significant relationship between curriculum structure and learning problems (see Table 2). Because of this, hypothesis 3 is not supported.

While testing hypothesis 3, a relationship was not noted between the presence of learning problems and the structure of curriculum. However, some kind of relationship was noted between curriculum choice and learning problems. This relationship was investigated further. The lack of teacher involvement (teacher involvement as defined by the use of a curriculum in which the parent has to be involved in the child's learning) in the learning process appears to be related to learning difficulties in children (see Table 2). Curricular choices were divided into teacher involvement and non-teacher involvement. Textbook/workbook, teacher lecture, teacher-developed with assignments, and teacher-developed with no assignments were considered as teacher involved. Three categories of

Table 2
Results of Chi-square Analysis of Each Core-curriculum Area for Relationship of Curriculum Structure and Learning Problems and Relationship of Teacher Involvement and Learning Problems

	Relationship between structure of curriculum and learning problems		Relationship between teacher involvement and learning problems	
Curriculum	X^2 values	Significance	X^2 values	Significance
Geography	10.506	.001	7.510	.006
Handwriting	1.134	.287	7.052	.008
Language arts	5.008	.025	2.287	.131
Math	2.118	.146	7.809	.005
Phonics	2.074	.150	1.183	.277
Science	.077	.782	4.636	.031
Social Studies	.540	.463	.436	.509
Spelling	.230	.632	.630	.427
Vocabulary	.147	.702	3.413	.065
Writing	.470	.493	6.663	.010

Note: All analyses have 1 df.

curriculum--not-taught, child-directed, and Paces[1]--were considered as non-teacher involvement.

The children requiring the administration of a WISC-III were compared with those not requiring a WISC-III using chi-square statistical procedures in order to determine the significance of the relationship between curriculum choice and learning problems.

A 2 x 2 (learning problems vs. non-learning problems and teacher-involved curriculum vs. non-teacher-involved curriculum) chi-square analysis of each curricular content area was performed. Results were significant for five of the ten core-curriculum content areas: geography ($p < .001$), handwriting ($p < .01$), math ($p < .001$), science ($p < .001$), writing ($p < .01$). The content areas considered to be core-curriculum that were not significant were language-arts, phonics, social studies, vocabulary and spelling (see Figure 5).

Because 5 of the 10 core-areas of study demonstrated a statistically significant relationship between teacher involvement and learning problems, while only 2 of the 10 were significant when examining the relationship between curriculum structure and learning problems, these findings would suggest that teacher involvement is more important

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[1]Paces is a curriculum package in which both instructional and workbook material are provided in logical sequential steps. No instructor is required in order to use this curriculum. All that the student should require is included in the Paces book. A student completes each Pace packet before moving on to the next one.

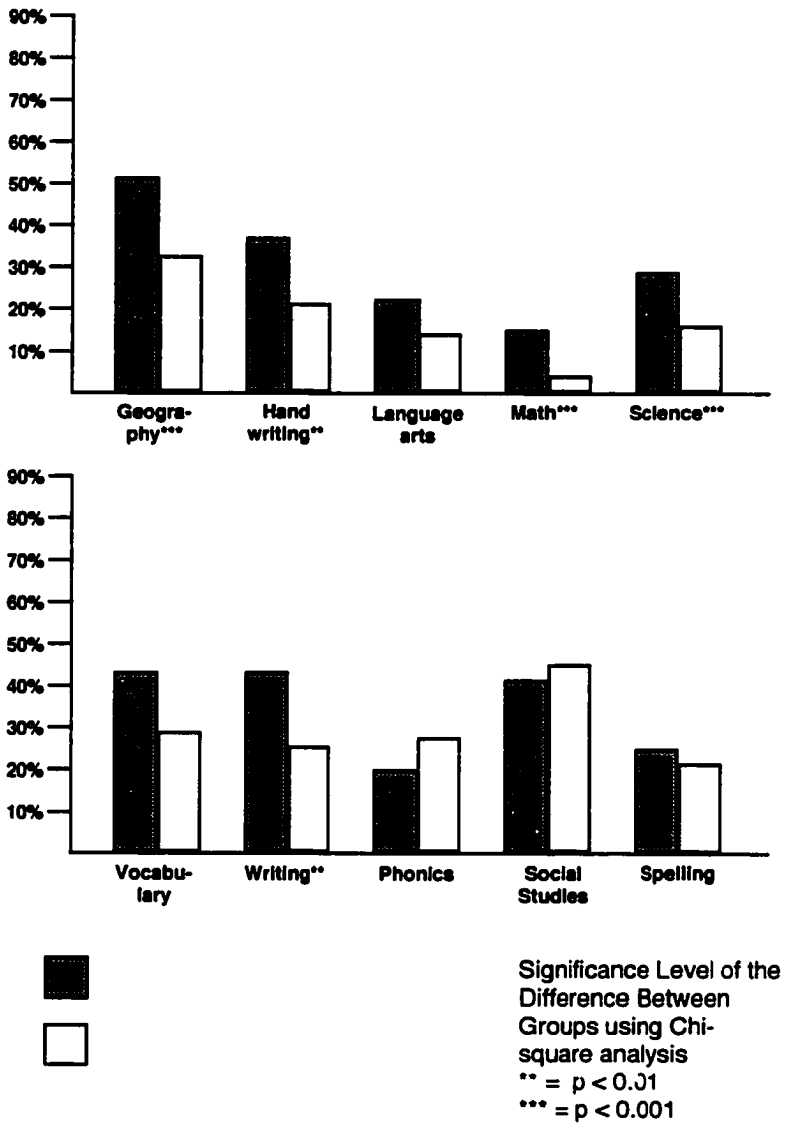

Figure 5. Difference between percentage of learning problem group versus non-learning problem group children taught by non-teacher involved curriculum: by subject area.

than curriculum structure in the development of learning difficulties experienced by home-schooled students.

It is likely that both curriculum structure and teacher involvement are related to the development of learning difficulties in children, with teacher involvement playing a wider role than curriculum structure. It would be reasonable to suggest that a modified concept of curriculum casualties is a valid alternative to the concept of LD in explaining learning problems faced by individual students.

However, since this is only a correlational relationship and not a causal one, caution should be taken in interpreting such findings. Perhaps the lower level of teacher involvement causes learning difficulties. It is also possible that the presence of learning difficulties causes the parents to become less involved in the teaching of their children, possibly due to the frustration of educating a learning disabled child. It is also possible that there is some other explanation for the relationship between learning problems and teacher involvement that has yet to be discovered.

Further examination of the data indicates that teacher involvement appears to be related to the achievement levels of all participants in the study. When compared with WRAT3 scores in arithmetic, reading, and spelling, a general trend toward greater achievement levels is noted in the teacher-involved group when compared with the

non-teacher-involved group. In other words, children experiencing teacher-involved methods of instruction tend to achieve at higher levels.

The combined WRAT3 score of each subject (arithmetic + reading + spelling / 3) was correlated with curriculum choice. WRAT3 standard scores were grouped by WRAT3 standard deviations (e.g., 55 to 70, 71 to 85, 85 to 100, etc.) and correlated with curriculum choice (no curriculum, child-directed curriculum, and paces curriculum being considered non-teacher-involved, while the other choices were considered teacher-involved) in a 2 x 6 chi-square design (see appendix C).

Of the core subject areas mentioned previously, four demonstrated statistically significant differences: geography ($p < 0.05$), language arts ($p < 0.05$), math ($p < 0.001$), and writing ($p < 0.01$). All subject areas show a trend toward higher achievement levels being associated with teacher involvement. This lends credence to the proposal that lack of teacher involvement is related to the presence of learning problems.

Summary Statement

Hypothesis 3 was not supported. A significant relationship was not noted between the structure of curriculum and learning problems.

The determining factor in the relationship between learning problems and curriculum appears to teacher

involvement with the student rather than the structure of the curriculum. This was noted during the analysis of structure of curriculum and was investigated further.

Teacher involvement was found to be significantly different between low achieving and normal achieving children in 7 of the 10 core-curriculum areas. This relationship was further supported by examination of the relationship between achievement levels and teacher involvement across the entire sample group.

Supplementary Observations

There is evidence from other studies that suggests that spelling is a subject that is not emphasized in the home-school population. One study on predictors of academic achievement in home-schoolers noted that spelling was the lowest percentile rank noted on the Stanford Achievement Test (SAT) for his sample group (Medlin, 1994). Another study (Tipton, 1990) found that, for third-grade home-schooled children, spelling was a weak subject area when compared with public-schooled children.

It may be that some of these children identified as LD in this study are also being taught spelling in an inappropriate manner. If this is the case, then 4 of the remaining 11 children could be excluded, leaving an LD rate of 2.3% (n = 7).

It sometimes happened that one child in the family would be above average intellectually, while his or her

siblings would be of average ability. This fact presented a dilemma to the parents who tended to compare their children's work. Often in this situation, when I informed the parent that the average child was achieving at a normal level, the parents were greatly relieved. Because the average child was being compared to the above average child, many parents thought that their average child was learning disabled, or had some kind of learning problem. This may reflect the pressure to excel, which many home-school parents feel.

One parent was participating in an online forum discussion about whether home-schoolers should meet or exceed state educational standards. I suggested that state educational standards are not the important issue. Rather, it is important that every child, in whatever educational environment he or she is in, should be expected to perform at the best of his or her individual ability, whatever that ability might be. The parent had not considered that there might be different levels of expectation for each child.

Of those families who stated that they followed the delayed academics philosophy of Dr. Moore (Moore et al., 1979), most did not appear to be following the basic assumptions of Dr. Moore. For example, instead of delaying formal education until ages 8 to 10, some parents were using "Delayed Academics" with much older children. These families appeared to be using no formal educational

philosophy or structure at all. If any philosophy could be said to describe these families, perhaps it would be Illich's concept of deschooling or unschooling (Illich, 1970).

CHAPTER 5

DISCUSSION

Summary of Results

Hypothesis 1 stated that using the Michigan State Board of Education criteria for determining learning disabilities as closely as possible (Michigan State Board of Education, 1986), less than 5% of the home-school population will meet the eligibility criteria for LD. Hypothesis 1 is not supported. There is no statistical significance between the public-school and home-school LD prevalence rates.

Hypothesis 2 stated that subjects identified as LD according to the Michigan State Board of Education definition would demonstrate characteristics that might indicate the presence of learning problems that are not ruled out by the exclusionary criteria or absence of "appropriate learning experiences" defined in the LD definition. Hypothesis 2 was not supported. The instruments used in this research design were unable to indicate further possibilities for the presence of LD in the sample group. Some ex post facto evidence suggests a possible means of excluding more children from such a diagnosis, but cannot

(or perhaps should not) be brought to bear on this hypothesis.

Hypothesis 3 stated that learning problems would be found most commonly in the home schools that use more structured curricula. Hypothesis 3 was not supported. A significant relationship was not noted between the structure of curriculum and learning problems.

The determining factor in the relationship between learning problems and curriculum appears to be the degree of teacher involvement with the student rather than the structure of the curriculum. This was noted during the analysis of the relationship between curriculum structure and learning problems and was investigated further.

Teacher involvement was found to be significantly different between low achieving and normal achieving children in 7 of the 10 core-curriculum areas. It would appear that the more involved the teacher is in the education of a child, there is less possibility of learning problems developing. This relationship was further supported by examination of the relationship between achievement levels and teacher involvement across the entire sample group.

Although there is likely to be some degree of overlap between the type or amount of structure of curriculum and teacher involvement, they are not synonymous. Paces are extremely structured, whereas child-directed studies are not. They both require very little teacher involvement.

Textbooks and workbooks are structured, whereas teacher-designed curricula (i.e., parent-designed) need not be so structured. They both may require a great deal of teacher involvement. The results of this study suggest that it may be teacher (parental) involvement that is involved in the prevention of learning difficulties, not the structure or type of curriculum.

For most core subjects, a significant difference was noted in the curriculum choices of those parents whose children were experiencing learning problems when compared with the curriculum choices of those parents whose children who did not exhibit learning difficulties (see Table 2). The group that exhibited low levels of achievement tended to use curricula that encouraged less teacher involvement.

It is of interest to note that the Michigan State Board of Education rules for special education state that "programs for the learning disabled shall have no more than 10 students in the classroom at any one time, and the teacher shall be responsible for the educational programming for no more than 15 different students" (Michigan State Board of Education, 1986, p. 33). This is a small student/teacher ratio when compared with most regular education classrooms, and it would be safe to assume that the reasoning for the smaller class sizes is to ensure greater teacher involvement in the student's learning experiences.

Implications of Results

While the results of this study indicate that there is no difference between the prevalence rates of LD for public-school and home-school students, the review of the literature lends credence to the opinion that LD is a construct that is broadly used, and commonly misused, even within the research literature. It is a concept that has been vaguely defined, and the definition is rarely adhered to in practice (McLoughlin & Netick, 1983).

One possible explanation for learning problems within the home school population is the construct of curriculum casualties. A clear correlation was noted between the type of curriculum used and the learning problems noted. However, it was not the curriculum itself but the teacher involvement required by the curriculum that seems to be the relevant factor. It seems that a lack of interaction, involvement, and guidance from the teacher, or in the case of this population, the parent is correlated with learning problems in the home-school population. This is consistent with the literature, which shows that small class size and more available time spent by the teacher with each child correlates with greater academic improvement (Caccamo, 1985; Keith et al., 1993).

However, some families have both LD and non-LD classifiable children, suggesting that learning is a highly individual process and that an educational environment that works for one child will not be enough for another

child. This suggests that the learning process is affected by numerous factors, and it is likely that many of them contribute to the learning problems of individual children. It is possible that, for some children, both neurological and environmental factors are involved when a child has difficulty in learning (Coles, 1987).

For the home-school population, it would seem that the more involved the parent or teacher is in the educational process of the child, the less likely that learning problems will be present. However, it is also possible that the learning problems of a child leads to decreased levels of interaction with the parent-teacher. It would then follow that individual or small-group interaction with the parent, teacher, or authority figure would decrease the likelihood of learning problems (Caccamo, 1985). Such a level of involvement is not possible in a regular classroom, where the teacher has 25-35 students to educate, unless innovative methods such as cooperative learning, peer tutoring, team teaching, and other such educational methods are employed.

The advantage of individual instruction, small class sizes, and other educational innovations is that missed concepts or gaps in the knowledge base of a student are more likely to be identified and remediated quickly before a negative attributional set is instilled in a child. This level of individual attention might prevent the possibility of learning problems developing into a condition

of "learned helplessness" or a negative attributional set, and perhaps would avoid the need for such labels as LD. It would appear that constructs such as Curriculum Casualty, or perhaps "Institutional Casualty" (which I would define as the misfit between an individual child and institutional practices and policies that do not make allowances for individual needs of students) would as readily explain the learning difficulties of students as does the construct of LD.

Perhaps Institutional Casualty is to be preferred over Curriculum Casualty because the term Curriculum Casualty may imply, for some, that there is no possibility of neurological causation. The concept of Institutional Casualty implies only that the struggling child does not "fit" into the existing institutional system and requires (for whatever reason) a different educational experience than the majority of his or her peers.

Limitations

The application and generalizability of this research is limited in several ways, some due to the nature and design of the study and some due to the nature of the LD construct. The most important limitation is that the sample group consisted of a convenience sample. A response rate of 26% from the initial mailing may not be representative of the whole home-school population in Michigan. Home-schoolers tend to be careful about others knowing that they are educating their children in this

manner. This is believed to be due to the history of harassment and opposition home-schoolers have often received from educational boards and the somewhat ambiguous nature of the legality of home education in many states (Furst, 1992). Although the legal and social climate is becoming more accepting of home education, a reluctance to be identified and contacted still exists with many home school parents.

In order to foster a trusting and respectful relationship with the home school community, the initial contact letter ensured the parents that they would not receive further contact from the researcher should they choose not to participate in the study. Because of this, no effort was made to investigate reasons for non-participation.

Due to the nature of home schooling, it was not possible to determine the quality of the education the subjects were receiving. It is difficult, if not impossible, to create an experimental condition when one is unable to control important variables involved in the study, and so the generalizability of this research is limited.

A large number (21.8%) of respondents thought that their child might have a learning problem. This may have skewed the population sample to include a greater or lesser percentage of children with learning difficulties than really exists in the home-school community at large. The title of the study listed on the informed consent

letter was Learning Disabilities Within the Homeschool Population. This could have prevented some families from participating, since they may have assumed that the study required subjects who had learning disabilities.

Implications for Future Research

The results of this study suggest that lack of teacher involvement is related to the presence of learning problems, or what is identified as LD, within the educational community. Teacher involvement is limited by the number of children a teacher must teach at any given time --in other words, student/teacher ratio. A search of the Educational Resources Information Center (ERIC) database produced no references for class size, student/teacher ratio, or student/teacher interaction as etiological factors in LD.

While there is research available that indicates that student/teacher interaction and teacher expectations affect the educational success of students (Pedersen, Faucher, & Eaton, 1978; Rist, 1973), these factors as etiological factors in LD have not been investigated. Such research implies that classroom-interaction factors are involved in developing learning problems, but no direct link between such factors and LD has been systematically studied.

Home schooling is an area of education that remains relatively unexplored by educational research. Many questions remain unasked, let alone unanswered. Specific to

the scope of this study are questions such as: How are curriculum choices made by parents who home school? What are the special educational needs of home school children? How are these needs met?

The results of this research lend credence to the interactivity theory of learning disabilities proposed by Gerald Coles (1987). Therefore, it is suggested that research into the interactivity theory of LD be pursued in a more systematic manner within the home-school population as well as the public-school population. In many respects this has begun, at least within the public-school population. More and more LD research is looking into non-neurological factors such as self-concept (Ayres, Cooley, & Dunn, 1990), attribution (Jacobsen, Lowery, & DuCette, 1986; Kistner, Osborne, & LeVerrier, 1988; Lowenthal, 1986), locus of control (Dudley-Marling, Snider, & Tarver, 1982; Kane-Lewis & Lawrence-Patterson, 1989), and social interaction (LaGreca & Vaughn, 1992; Miller, 1964; Perosa & Perosa, 1982; Wilchesky & Reynolds, 1986).

Although none of these researchers has specifically researched Coles's interactivity theory, the scope and focus of their research are within the domains recognized by Coles as comprising areas of his theory. However, a unifying theory of LD has yet to emerge. Perhaps the theory of interactivity (Coles, 1987) is a step in the right direction.

This research highlights the problem of consistency

in LD research. If LD is to continue as a concept, it is imperative that standardized definitional criteria be used to identify LD. It is also imperative that the definitional standards be rigorously applied by the school systems so that it becomes possible to identify those children who do have a diagnosable problem that is consistently identifiable.

Ancillary Observations

The following observations resulting from this study are secondary to the research focus of the study but are included as general information because they appear to relate to the dynamics of home schooling and the potential for learning problems. It is hoped that these observations will generate interest in further research into this form of education.

There appears to be a general pattern to the curricular choices made by home-school parents. As the decision is made to home school, a certain amount of doubt and uncertainty is present. Accordingly, parents are more likely to do what is called "school at home" rather than the more unstructured home schooling. A curriculum package is often chosen that provides a comprehensive curriculum. These are often purchased through curriculum providers who perform placement testing, provide the curriculum, often provide a testing service, offer some form of accreditation, and assign grades for the work completed.

This is basically a correspondence-course type of education.

As parents become more comfortable with home schooling, they are likely to experiment with more varied types of curricula, often becoming less structured and more open to experimentation. It can be said that parents at this point begin to fine-tune the curriculum to their child's particular needs. Most home-schoolers seem to go through a kind of "adolescence" of experimentation, becoming less structured in their academic strategy (Knowles, 1988; Van Galen, 1988). Eventually, a curriculum is organized to best fit the child's needs (or sometimes the parents' needs) and school becomes once again a more structured, less haphazard endeavor. Not all home-schoolers go through this cycle, but it appears as if this is a general theme in curricular choice among those who continue to educate their children at home over a period of years.

Another observation made during the data-collection phase of this study is that many mothers (who are the primary teachers for most home-schoolers) seem to have a basic anxiety about their ability to adequately educate their children. This is exacerbated by the research findings disbursed widely among the home-school publications, which consistently place home-schooled children in the higher percentiles on standard tests of ability or achievement (Ray, 1991). For a mother to hear that home-schooled children perform above the mean, when her child

is average or perhaps struggling, can be disheartening, and often leaves her wondering if she is doing something wrong because her child is not doing well.

While it is understandable that home-school advocates like to celebrate the successes and the accomplishments of home-schooled children, more needs to said about the average home-schooled child, and parents should be encouraged to celebrate the achievements of their children who are performing at the best of their ability, whatever level of ability that may be.

Conclusions

Several people who have been asked to read draft copies of this manuscript have voiced the opinion that it does not really matter what we call the disorder known as LD, or indeed what causes the disorder. What is important to many parents and educators is: How do we help the children who are not learning in the usual manner (P. Butchbaker, personal communication, September 24, 1994)? Others have suggested that the LD label helps the child (and the parents) maintain some level of self-esteem or dignity, as it removes the responsibility for the learning problem from the child or the parent. Instead, the traditional LD construct suggests that the learning problem is not the "fault" of anyone, but is a genetic deficit beyond the parameters of anyone to alter.

Ross (1977) addresses these issues:

> From dunce and dollard and dolt, we gradually developed more sophisticated sounding terms, some with graeco-latin pretensions. Underachievement, perceptual-motor disorder, psycholinguistic retardation, perceptual handicap, hyperactivity, hyperkinesis, hypermotility, distractibility, impulsivity, dyslexia, dyscalculia, brain injury, minimal brain damage, minimal cerebral dysfunction, and psychoneurological learning disability have all had their day or still have currency. At the present time, the favored term is learning disability or specific learning disability. Note that all of these terms are nouns so that they are used to complete such sentences as, "This child has . . . " or "This child suffers from . . . " We no longer speak of demons which must be cast out. We speak instead of disease-like entities which must be cured. An educational problem has thus been cast in the terms of a medical problem, neatly shifting the responsibility from the teacher to the physician. (Ross, 1977, p. 5)

And further:

> When a problem is given a label, the problem is not explained; the question of why the problem arose is not answered. Not only that, but the labels have a way of guiding the behavior of those who use or hear the label. . . . Yet labels such as these are often loosely bandied about and almost casually attached to given children, not because the child will thus be helped but because the label absolves somebody of responsibility for doing something for the child by transferring this responsibility to another school, department, or discipline. (Ross, 1977, p. 7)

The problem with labels such as LD is that the label has the potential to lead to a lowering of expectations for the identified student. Caccamo (1985) in his report on the effectiveness of the Focus Curriculum Project stated that one of the difficulties the project had to overcome was reintegration of the student into regular classrooms:

> Another difficulty encountered has been the reluctance of the resource learning disabilities teacher to believe that an LD student can demonstrate such growth in such a short period of time. Even the objective data had not convinced some of the resource LD teachers that these gains had been made. (Caccamo, 1985, chap. 13)

It is apparent that less deterministic causes for the learning difficulties of children can be just as effective in describing the phenomenon of learning problems. However, other theories imply that something is wrong with either the child's education or the child's motivation to learn. Rather than hiding from such causal theories behind a construct such as LD, students might be better served by discovering what each student needs, be it neurological functioning, motivation, different curriculum, more intensive involvement from teachers, or something else, and by providing the child with the best resources available to meet the need. In this way, every child's education would be "special."

In many respects, public education in America has become an assembly line process. This has happened for many reasons, and is not necessarily the fault of teachers. There are millions of children who must be educated, and there are only a limited amount of resources available to educate them. Many children do not fit into the assembly line easily, and need more attention than other children. Many teachers cannot effectively take care of the learning needs of one or two children with special needs and still teach the other 20-30 children in the class.

Perhaps a more appropriate name for what is known as LD would be Learning Difficulty Syndrome (LDS). This term allows for a wide range of etiology underlying the learning difficulties experienced by children. Such an understanding of learning problems would then allow for a teacher to investigate more fully the reasons for the child's difficulty and take appropriate steps to remediate the problem. However, this would require a significant change in the educational system as it is currently operated. To enable a child to receive appropriate educational experiences, which make use of his or her strengths, learning style, personality, and ability, the system needs to become much more flexible and sensitive to the individual needs of the child.

Perhaps the most significant results from this research are that the data support the need for teacher involvement in a child's education. It could be said that most, if not all, children appear to be able to learn if and when they are taught in an effective manner. It is not enough to merely place a child in a room in which teaching takes place. Learning is not a passive or static process. Teaching children takes involvement, action, and hard work on the part of both teacher and student. Finding ways to increase the amount of student/teacher interaction (whether the "teacher" is a teacher's aide, parent-volunteer, older peer, or other person), and to individualize a child's education to the greatest extent possible, would mean that every child is enabled to learn to the extent of his or her potential, and

that every child will receive an education that is special.

APPENDIX A

MAILING MATERIALS

Study Title: Learning Disabilities within the homeschool population.

Informed Consent Form

The purpose of this study is to examine whether there is any evidence of learning disabilities among homeschoolers. I will be testing 300 children who have been homeschooled for at least one year and are between the ages of 6 - 16 years old. **Participation in the study is absolutely voluntary and confidential.**

The benefit to the participants is that parents will receive free of charge the results of test(s) the child participates in; an achievement test for each participant and for selected children a test of ability. This information will be helpful to parents/teachers, because it will indicate areas of strengths and weakness, enabling parents to tailor future learning programs.

Conditions of participation: requirements and information.

1. The child(ren) need to have been homeschooled for at least one year.
2. The child(ren) need to be between 6 - 16 years old.
3. The child(ren) will be identified by number to ensure confidentiality.
4. The child(ren) will need to complete the WIDE RANGE ACHIEVEMENT TEST, the third revision, (WRAT3).
    a) This test takes between 30 - 45 minutes to give. Two of the subtests, math and spelling, can be given to more than one child at a time; the third subtest, reading, must be given individually.
5. Test results will be given to the parents immediately following the testing. They take only a few minutes to compute.
6. A demographic and curriculum survey needs to be completed by the parent(s) at the time of testing.
7. The testing would take place at the child(ren)'s home or agreed upon location.
8 Selected children will be asked to take an additional ability test called the WECHSLER INTELLIGENCE SCALE for CHILDREN (WISC III).
    a) This test takes about 2 hours to give.
    b) Test result will have to be sent to parents.
9. Participation is completely voluntary and free of charge.
10. Parent(s) (and children over the age of 7) need to sign the

Informed Consent Form.

If after reading the Informed Consent and you would like to have your children participate please return the postcard included.
If you have further questions you would like answered first, you can contact me (Paul Kitchen) at 616-782-3444. If you have any questions concerning this study that you would prefer to direct to the university you may contact Dr. Jim Tucker at (616) 471-3475.

I, _____, affirm that I have read and understand the information in this consent form and have had all my questions answered. I agree to allow my child(ren) participate in this study under the conditions for participation I have read above.
Each child that participates who is 7 years old and older must write his own name according to the regulations of the Human Subjects Review Board of Andrews University. 6 year-olds do not need to write their own name, a parent may do it for him or her.

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Parent's Signature:

Parent's Signature:

Give this form to the tester at the testing appointment.

To reach me by mail write: Paul Kitchen 32850 Middle Crossing, Dowagiac, MI 49047 or Paul Kitchen, c/o Andrews University, School of Education, Berrien Springs, MI 49103.

Study Title: Learning Disabilities within the homeschool population.

Informed Consent Form

The purpose of this study is to examine whether there is any evidence of learning disabilities among homeschoolers. I will be testing 300 children who have been homeschooled for at least one year and are between the ages of 6 - 16 years old. **Participation in the study is absolutely voluntary and confidential.**

The benefit to the participants is that parents will receive free of charge the results of test(s) the child participates in; an achievement test for each participant and for selected children a test of ability. This information will be helpful to parents/teachers, because it will indicate areas of strengths and weakness, enabling parents to tailor future learning programs.

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5. Test results will be given to the parents immediately following the testing. They take only a few minutes to compute.
6. A demographic and curriculum survey needs to be completed by the parent(s) at the time of testing.
7. The testing would take place at the child(ren)'s home or agreed upon location.
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    a) This test takes about 2 hours to give.
    b) Test result will have to be sent to parents.

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Each child that participates who is 7 years old and older must write his own name according to the regulations of the Human Subjects Review Board of Andrews University. 6 year-olds do not need to write their own name, a parent may do it for him or her.

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Date:_____Child's Signature:

Parent's Signature:_____**PARENT'S COPY**

Parent's Signature:_____**PARENT'S COPY**

To reach me by mail write: Paul Kitchen 32850 Middle Crossing, Dowagiac, MI 49047 or Paul Kitchen, c/o Andrews University, School of Education, Berrien Springs, MI 49103.

Dear Parent(s), June 1, 1994

My name is Paul Kitchen and I am a student at Andrews University in Berrien Springs, Michigan. For my dissertation I am conducting research on learning disabilities among homeschoolers. This study has been formally approved by the Human Subjects Review Board of Andrews University.

To introduce myself I would like to say that my wife and I have been homeschooling our three children for the last three years. We are members of INCH (Michigan's State Homeschool Organization), Home School Legal Defense Association, Dowagiac Area Homeschool Group and the KONOS Cooperative of Michiana.

I would appreciate it if you would read the enclosed information and consider participating in my research. Participation is completely voluntary and confidential. If you choose not to participate, just dispose of the information.

If there are ANY questions feel free to call collect (616) 782-3444.

Sincerely,

Paul Kitchen

Dear Parent(s), June 1, 1994

My name is Paul Kitchen and I am a student at Andrews University in Berrien Springs, Michigan. For my dissertation I am conducting research on learning disabilities among homeschoolers. This study has been formally approved by the Human Subjects Review Board of Andrews University.

To introduce myself I would like to say that my wife and I have been homeschooling our three children for the last three years. We are members of INCH (Michigan's State Homeschool Organization), KAHSA, Home School Legal Defense Association, and a KONOS homeschool group.

I submitted a proposal to the KASHA board late last year informing them that I would like to ask members to participate in this study because it has the benefit of furthering research about homeschooling. They have asked that I state that their position is that they neither discourage or encourage participation in my study and that it is the individual choice of members.

I would appreciate it if you would read the enclosed information and consider participating in my research. Participation is completely voluntary and confidential. If you choose not to participate, just dispose of the information.

If there are ANY questions feel free to call collect (616) 782-3444.

Sincerely,

Paul Kitchen

Back Postcard

My name is _____ and I have read and signed the information you sent me. We would like to participate in your research.

You can contact me at _____. The best time to reach me is _____.

I have_____ (number) child(ren) that can participate.

Front Postcard

Paul Kitchen
32850 Middle Crossing
Dowagiac, MI 49047

APPENDIX B

SURVEYS

Demographic Survey

Age of Parents: Father_____ Mother

Total Family Income:	0	0	0	0	0	0	0	0	0
(check which applies)	Under 10,000	10,000 20,000	20,000 30,000	30,000 40,000	40,000 50,000	50,000 60,000	60,000 70,000	70,000 80,000	80,000 above

Education: State the highest level of education received by both parents (check which applies)

Father	0	0	0	0
Mother	0	0	0	0
	High school or less	1 - 5 yrs. college (no degree)	B.S. or B.A.	Graduate School

Number of children at home:

Family Status:	0	0	0	0	0
	Father and Mother	Father only	Mother only	Grandparent(s)	Guardian
Ethnic Origin:	0	0	0	0	0
	Hispanic	Caucasian	Native Amer.	Asian Amer.	African Amer.

Religious Orientation:

Check one.

Did you decide to participate in this study because:

_____you are aware of a learning problem in your child(ren).

_____ you would like to assist in research into homeschooling.

Please fill out a separate form for each child.

CURRICULUM SURVEY

Number #

Student's Age Grade

Sex

Has this student ever been enrolled in:
(check all that apply)

Public____, Private____, Home school____,

# of yrs.___, # of yrs.___, # of yrs.___,

1. Who is primary teacher? Mother____, Father____, Other____

2. What subjects do these teachers teach?
(Place a M for Mother, F for Father, or O for Other, in each blank depending on who teaches each subject. Skip subjects that do not apply).

Math_____
Phonics/Reading _____
Spelling_____
Vocabulary_____
Handwriting_____
Language Arts/ Grammer_____
Writing_____
Science_____
History_____
Geography_____
Religious studies_____
Art_____
Foreign Language_____
Social Studies_____
Music_____
Vocational Skills_____ name of skill_____
Vocational Skills_____ name of skill_____
(woodworking, auto repair, sewing, etc.)

3. Below are descriptions of types of curriculum listed by number. After reading the descriptions place the appropriate number in the blank after each subject, skip those subjects that do not apply.

1. Child directed study - Child chooses subject material and studies at his or her own pace. No teacher direction required.

2. Paces - Student directed, self contained instruction workbooks that a child would complete to move on to the next level. These self contained workbooks sometimes called Life Pacs or Paces may contain up to 10 paces, in a school year, per subject.

3. Textbook/Workbook - The child reads the textbook and answers the questions in the workbook. **OR** The workbook may include the textbook, such as a handwriting workbook. Minor instruction given when a child comes across something he/she does not understand.

4. Teacher lecture with student assignment - The teacher would give most of the instruction out of pre-developed curriculum, rather than depending wholey on a textbook to teach the information to the child. The child would then be given the pre-developed assignment.

5. Teacher developed curriculum with assignments - The teacher would develop their own curriculum and give instruction using library books, encyclopedias, and other information resources, then develop and give assignments based on that instruction.

6. Teacher developed curriculum with NO assignments - The teacher would develop their own curriculum and give instruction using library books, encyclopedias, and other information resources, with no further assignments.

Math_____
Phonics/Reading _____
Spelling_____
Vocabulary_____
Handwriting_____
Language Arts/ Grammer_____
Writing_____
Science_____
History_____
Geography_____
Religious studies_____
Art_____
Foreign Language_____

Social Studies_____
Music_____
Vocational Skills_____ name of skill_____
Vocational Skills_____ name of skill_____
(woodworking, auto repair, sewing, etc.)

4. List grade level that was last worked at in each subject. Skip those that do not apply.

Math_____
Phonics/Reading _____
Spelling_____
Vocabulary_____
Handwriting_____
Language Arts/ Grammer_____
Writing_____
Science_____
History_____
Geography_____
Religious studies_____
Art_____
Foreign Language_____
Social Studies_____
Music_____
Vocational Skills_____ name of skill_____
Vocational Skills_____ name of skill_____
(woodworking, auto repair, sewing, etc.)

5. What is your child's favorite and least favorite subject? Write favorite and least favorite next to one subject each.

Math_____
Phonics/Reading _____
Spelling_____
Vocabulary_____
Handwriting_____
Language Arts/ Grammer_____
Writing_____
Science_____
History_____

Geography_____
Religious studies_____
Art_____
Foreign Language_____
Social Studies_____
Music_____
Vocational Skills_____name of skill_____
Vocational Skills_____name of skill_____
(woodworking, auto repair, sewing, etc.)

6. What is the easiest and the hardest subject for your child? Write easiest and hardest next to one subject each.

Math_____
Phonics/Reading _____
Spelling_____
Vocabulary_____
Handwriting_____
Language Arts/ Grammer_____
Writing_____
Science_____
History_____
Geography_____
Religious studies_____
Art_____
Foreign Language_____
Social Studies_____
Music_____
Vocational Skills_____name of skill_____
Vocational Skills_____name of skill_____
(woodworking, auto repair, sewing, etc.)

7. Does your child like school? Check one.

_____VERY MUCH
_____GENERALLY LIKES IT
_____GRIN AND BEARS IT
_____NOT TOO MUCH
_____CAN'T STAND IT

8. If NOT TOO MUCH or CAN'T STAND IT, why do you think that is?

9. How much do you like to teach? Check one.

_____VERY MUCH
_____GENERALLY LIKE IT
_____GRIN AND BEAR IT
_____NOT TOO MUCH
_____CAN'T STAND IT

10. If NOT TOO MUCH or CAN'T STAND IT, why do you think that is?

11. What kind of learner is your child? Check one.

_____VISUAL (reading)
_____TACTILE (writing)
_____AUDIO (hearing)
_____NOT SURE

12. How long is your school day, each day? Use your best approximate.

MONDAY_____
TUESDAY_____
WEDNESDAY_____
THURSDAY_____
FRIDAY_____
SATURDAY_____
SUNDAY_____

13. What is the most FRUSTRATING part of homeschooling for you? Check THREE.

_____When the child does not "get it".
_____When the child does not sit still and cooperate.
_____The teaching.
_____The preparation.
_____When the child's work is done incorrectly.
_____When the child does not try hard enough and you are sure he/she could "get it".
_____Your too busy to get everything in your housework done, but you had a good homeschooling day.
_____You have planned more than can be done in one day.

14. What is the most REWARDING part of homeschooling for you? Check THREE.

_____When the child does "get it".
_____When the child does sit still and cooperate.
_____The teaching.
_____The preparation.
_____When the child's work is done correctly.
_____When the child does try hard and "gets it".
_____Your housework got done and you had a good homeschooling day.
_____You have planned just what could be done in one day.

15. Does your child read for entertainment? If so how much?

YES _____ HOURS PER **WEEK** or NO

16. Does your child play educational or entertainment computer or video games? If so how often?

YES _____ HOURS PER **WEEK** or NO

17. Does your child watch television? If so how often?

YES _____ HOURS PER **DAY** or NO

18. Does your child participate in a homeschool group? If so how often does your child participate?

YES _____ TIMES PER **MONTH** or NO

19. What kinds of activities does your child participate in with the homeschool group? Check all that apply.

_____SPORTING ACTIVITIES (team sports, swimming, skiing, skating, etc.)
_____SCIENCE PROJECTS/SCIENCE FAIRS
_____DRAMA OR MUSICAL PRODUCTIONS
_____BAND
_____ART PROJECTS
_____FIELD TRIPS
_____COMMUNITY SERVICE PROJECTS OR ACTIVITIES
_____ENTERTAINMENT ACTIVITIES (hayrides, campouts, etc.)
_____SUBJECT ORIENTED CLASSES (science, sewing, etc.)

20. What extracurricular activities does your child participate in (not related to the homeschool group) and how often? Just write the number or times a month in those blanks that apply.

Music_____
Sports_____
Church_____
4-H_____
Boy/Girl Scouts
Other:_____ _____

21. How did you child learn to read?

_____PHONICS
_____SIGHT READING
_____BOTH

22. Are you aware of any learning problems with your child?

_____YES **If YES what kind?**_____
_____NO

23. Has your child ever been screened for a learning disability?

_____YES **If YES, what was the conclusion?**_____
_____NO
_____

24. Has your child ever experienced a crisis? (death of close relative, divorce, or other traumatic experience for a child)?

_____YES **If YES, how long ago?**_____
_____NO

25. Has your child's vision ever been tested?

_____YES **If YES, were glasses required?** _____YES _____NO
_____NO

26. Has your child's hearing ever been tested?

_____YES **If YES, were hearing aids required?**_____YES
_____NO
_____NO

27. Has your child ever been in counseling or exhibited behavioral problems more than expected for your child's age?

_____YES **If YES, how long ago?**_____
_____NO

THANK YOU SO VERY MUCH FOR YOUR PARTICIPATION!

APPENDIX C

STATISTICAL DATA

Legend for statistical data.

1. Variable Name — Curriculum

Variable Name	Curriculum
Curgeog	Geography
Curhnd	Handwriting
Curlgart	Language Arts
Curmath	Math
Cursci	Science
Curphon	Phonics
Cursoc	Social Studies
Curspll	Spellling
Curvoc	Vocabulary
Curwrtng	Writing

2. Relationship between curriculum structure and learning problems

Column 1 = No Structure — Row 1 = Learning Problems
Column 2 = Structure — Row 2 = No Learning Problems

3. Relationship between learning problems and teacher involvement

Column 1 = Non- Involved — Row 1 = Learning Problems
Column 2 = Involved — Row 2 = No Learning Problems

4. Relationship between combined WRAT3 standard scores and teacher involvement

Column 1 = Non Involved
Column 2 = Involved

Row 1 = Achievement score 49-70
Row 2 = Achievement score 71-85
Row 3 = Achievement score 86-100
Row 4 = Achievement score 101-115
Row 5 = Achievement score 116-130
Row 6 = Achievement score >130

Chi-Square analysis of relationship between curriculum structure and learning problems.

GROUP by CURGEOG

CURGEOG Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		46	8	54
		85.2	14.8	18.2
2.00		151	92	243
		62.1	37.9	81.8
Column Total		197	100	297
		66.3	33.7	100.0

Chi-Square	Value	DF	Significance
Pearson	10.50640	1	.00119
Continuity Correction	9.49985	1	.00205
Likelihood Ratio	11.75611	1	.00061
Mantel-Haenszel	10.47102	1	.00121

Minimum Expected Frequency - 18.182

GROUP by CURHND

CURHND Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		20	34	54
		37.0	63.0	18.2
2.00		72	171	243
		29.6	70.4	81.8
Column Total		92	205	297
		31.0	69.0	100.0

Chi-Square	Value	DF	Significance
Pearson	1.13383	1	.28696
Continuity Correction	.81385	1	.36699
Likelihood Ratio	1.10622	1	.29290
Mantel-Haenszel	1.13001	1	.28777

Minimum Expected Frequency - 16.727

GROUP by CURLGART

CURLGART Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
	1.00	16 29.6	38 70.4	54 18.2
	2.00	40 16.5	203 83.5	243 81.8
	Column Total	56 18.9	241 81.1	297 100.0

Chi-Square	Value	DF	Significance
Pearson	5.00771	1	.02523
Continuity Correction	4.18399	1	.04081
Likelihood Ratio	4.57861	1	.03237
Mantel-Haenszel	4.99085	1	.02548

Minimum Expected Frequency - 10.182

GROUP by CURMATH

CURMATH Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
	1.00	7 13.0	47 87.0	54 18.2
	2.00	17 7.0	226 93.0	243 81.8
	Column Total	24 8.1	273 91.9	297 100.0

Chi-Square	Value	DF	Significance
Pearson	2.11790	1	.14559
Continuity Correction	1.39074	1	.23828
Likelihood Ratio	1.88826	1	.16940
Mantel-Haenszel	2.11077	1	.14627
Fisher's Exact Test:			
One-Tail			.12151
Two-Tail			.16632

Minimum Expected Frequency - 4.364
Cells with Expected Frequency < 5 - 1 OF 4 (25.0%)

GROUP by CURSCI

GROUP	Count / Row Pct	CURSCI 1	CURSCI 2	Row Total
1.00		32	22	54
		59.3	40.7	18.2
2.00		139	104	243
		57.2	42.8	81.8
Column Total		171	126	297
		57.6	42.4	100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	.07658	1	.78199
Continuity Correction	.01551	1	.90090
Likelihood Ratio	.07680	1	.78168
Mantel-Haenszel	.07632	1	.78234

Minimum Expected Frequency - 22.909

GROUP by CURPHON

GROUP	Count / Row Pct	CURPHON 1	CURPHON 2	Row Total
1.00		14	40	54
		25.9	74.1	18.2
2.00		88	155	243
		36.2	63.8	81.8
Column Total		102	195	297
		34.3	65.7	100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	2.07391	1	.14984
Continuity Correction	1.64274	1	.19995
Likelihood Ratio	2.15149	1	.14243
Mantel-Haenszel	2.06692	1	.15052

Minimum Expected Frequency - 18.545

GROUP by CURSOC

GROUP	Count / Row Pct	CURSOC 1	CURSOC 2	Row Total
	1.00	43 79.6	11 20.4	54 18.2
	2.00	182 74.9	61 25.1	243 81.8
	Column Total	225 75.8	72 24.2	297 100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	.53880	1	.46293
Continuity Correction	.31192	1	.57650
Likelihood Ratio	.55560	1	.45604
Mantel-Haenszel	.53698	1	.46369

Minimum Expected Frequency - 13.091

GROUP by CURSPLL

GROUP	Count / Row Pct	CURSPLL 1	CURSPLL 2	Row Total
	1.00	19 35.2	35 64.8	54 18.2
	2.00	94 38.7	149 61.3	243 81.8
	Column Total	113 38.0	184 62.0	297 100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	.22934	1	.63201
Continuity Correction	.10495	1	.74597
Likelihood Ratio	.23122	1	.63062
Mantel-Haenszel	.22857	1	.63259

Minimum Expected Frequency - 20.545

GROUP by CURVOC

CURVOC Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		28	26	54
		51.9	48.1	18.2
2.00		119	124	243
		49.0	51.0	81.8
Column Total		147	150	297
		49.5	50.5	100.0

Chi-Square	Value	DF	Significance
Pearson	.14667	1	.70174
Continuity Correction	.05406	1	.81614
Likelihood Ratio	.14667	1	.70173
Mantel-Haenszel	.14617	1	.70222

Minimum Expected Frequency - 26.727

GROUP by CURWRTNG

CURWRTNG Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		31	23	54
		57.4	42.6	18.2
2.00		127	116	243
		52.3	47.7	81.8
Column Total		158	139	297
		53.2	46.8	100.0

Chi-Square	Value	DF	Significance
Pearson	.46956	1	.49319
Continuity Correction	.28568	1	.59300
Likelihood Ratio	.47137	1	.49236
Mantel-Haenszel	.46798	1	.49392

Minimum Expected Frequency - 25.273

Chi-Square analysis of relationship between learning problems and teacher involvement

GROUP by CURGEOG

CURGEOG Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		28 51.9	26 48.1	54 18.2
2.00		78 32.1	165 67.9	243 81.8
	Column Total	106 35.7	191 64.3	297 100.0

Chi-Square	Value	DF	Significance
Pearson	7.51082	1	.00613
Continuity Correction	6.67486	1	.00978
Likelihood Ratio	7.25429	1	.00707
Mantel-Haenszel	7.48553	1	.00622

Minimum Expected Frequency - 19.273

GROUP by CURHND

CURHND Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		20 37.0	34 63.0	54 18.2
2.00		49 20.2	194 79.8	243 81.8
	Column Total	69 23.2	228 76.8	297 100.0

Chi-Square	Value	DF	Significance
Pearson	7.05225	1	.00792
Continuity Correction	6.13794	1	.01323
Likelihood Ratio	6.49960	1	.01079
Mantel-Haenszel	7.02851	1	.00802

Minimum Expected Frequency - 12.545

GROUP by CURLGART

CURLGART Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		12	42	54
		22.2	77.8	18.2
2.00		34	209	243
		14.0	86.0	81.8
Column Total		46	251	297
		15.5	84.5	100.0

Chi-Square	Value	DF	Significance
Pearson	2.29651	1	.13050
Continuity Correction	1.70095	1	.19216
Likelihood Ratio	2.11663	1	.14571
Mantel-Haenszel	2.27881	1	.13115

Minimum Expected Frequency - 8.364

GROUP by CURMATH

CURMATH Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		8	46	54
		14.8	85.2	18.2
2.00		11	232	243
		4.5	95.5	81.8
Column Total		19	278	297
		6.4	93.6	100.0

Chi-Square	Value	DF	Significance
Pearson	7.80954	1	.00520
Continuity Correction	6.18594	1	.01289
Likelihood Ratio	6.33863	1	.01181
Mantel-Haenszel	7.78325	1	.00527
Fisher's Exact Test:			
One-Tail			.01068
Two-Tail			.01068

Minimum Expected Frequency - 3.455
Cells with Expected Frequency < 5 - 1 OF 4 (25.0%)

GROUP by CURPHON

GROUP	Count / Row Pct	CURPHON 1	CURPHON 2	Row Total
	1.00	11	43	54
		20.4	79.6	18.2
	2.00	67	176	243
		27.6	72.4	81.8
	Column Total	78	219	297
		26.3	73.7	100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	1.18326	1	.27669
Continuity Correction	.84060	1	.35923
Likelihood Ratio	1.23483	1	.26647
Mantel-Haenszel	1.17929	1	.27750

Minimum Expected Frequency - 14.182

GROUP by CURSCI

GROUP	Count / Row Pct	CURSCI 1	CURSCI 2	Row Total
	1.00	16	38	54
		29.6	70.4	18.2
	2.00	41	202	243
		16.9	83.1	81.8
	Column Total	57	240	297
		19.2	80.8	100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	4.63640	1	.03130
Continuity Correction	3.85030	1	.04974
Likelihood Ratio	4.25667	1	.03910
Mantel-Haenszel	4.62079	1	.03159

Minimum Expected Frequency - 10.364

GROUP by CURSOC

CURSOC Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		22	32	54
		40.7	59.3	18.2
2.00		111	132	243
		45.7	54.3	81.8
Column Total		133	164	297
		44.8	55.2	100.0

Chi-Square	Value	DF	Significance
Pearson	.43572	1	.50919
Continuity Correction	.25890	1	.61088
Likelihood Ratio	.43805	1	.50807
Mantel-Haenszel	.43426	1	.50991

Minimum Expected Frequency - 24.182

GROUP by CURSPLL

CURSPLL Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		14	40	54
		25.9	74.1	18.2
2.00		51	192	243
		21.0	79.0	81.8
Column Total		65	232	297
		21.9	78.1	100.0

Chi-Square	Value	DF	Significance
Pearson	.63024	1	.42727
Continuity Correction	.37448	1	.54057
Likelihood Ratio	.61066	1	.43454
Mantel-Haenszel	.62812	1	.42805

Minimum Expected Frequency - 11.818

GROUP by CURUOC

CURUOC Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		23	31	54
		42.6	57.4	18.2
2.00		72	171	243
		29.6	70.4	81.8
Column Total		95	202	297
		32.0	68.0	100.0

Chi-Square	Value	DF	Significance
Pearson	3.41264	1	.06470
Continuity Correction	2.84279	1	.09178
Likelihood Ratio	3.29081	1	.06967
Mantel-Haenszel	3.40115	1	.06515

Minimum Expected Frequency - 17.273

GROUP by CURBIRTHG

CURBIRTHG Page 1 of 1

GROUP	Count / Row Pct	1	2	Row Total
1.00		23	31	54
		42.6	57.4	18.2
2.00		61	182	243
		25.1	74.9	81.8
Column Total		84	213	297
		28.3	71.7	100.0

Chi-Square	Value	DF	Significance
Pearson	6.66289	1	.00984
Continuity Correction	5.82853	1	.01577
Likelihood Ratio	6.27606	1	.01224
Mantel-Haenszel	6.64046	1	.00997

Minimum Expected Frequency - 15.273

Chi-Square analysis of relationship between combined WRAT3 standard scores for entire sample group and learning problems

GROUP 1 by CURGEOG

GROUP 1	Count / Row Pct	CURGEOG 1	CURGEOG 2	Row Total
	1.00	1 25.0	3 75.0	4 1.3
	2.00	8 53.3	7 46.7	15 5.1
	3.00	37 49.3	38 50.7	75 25.3
	4.00	44 31.4	96 68.6	140 47.1
	5.00	16 26.7	44 73.3	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	106 35.7	191 64.3	297 100.0

Chi-Square	Value	DF	Significance
Pearson	13.21692	5	.02143
Likelihood Ratio	13.98807	5	.01569
Mantel-Haenszel	8.80797	1	.00300

Minimum Expected Frequency - 1.071
Cells with Expected Frequency < 5 - 4 OF 12 (33.3%)

GROUP1 by CURHND

CURHND Page 1 of 1

GROUP1	Count / Row Pct	1	2	Row Total
	1.00	2 50.0	2 50.0	4 1.3
	2.00	6 40.0	9 60.0	15 5.1
	3.00	18 24.0	57 76.0	75 25.3
	4.00	35 25.0	105 75.0	140 47.1
	5.00	8 13.3	52 86.7	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	69 23.2	228 76.8	297 100.0

Chi-Square	Value	DF	Significance
Pearson	8.44615	5	.13330
Likelihood Ratio	9.01630	5	.10842
Mantel-Haenszel	6.22336	1	.01261

Minimum Expected Frequency - .697
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

GROUP1 by CURLGART

CURLGART Page 1 of 1

GROUP1	Count / Row Pct	1	2	Row Total
	1.00	1 25.0	3 75.0	4 1.3
	2.00	5 33.3	10 66.7	15 5.1
	3.00	13 17.3	62 82.7	75 25.3
	4.00	25 17.9	115 82.1	140 47.1
	5.00	2 3.3	58 96.7	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	46 15.5	251 84.5	297 100.0

Chi-Square	Value	DF	Significance
Pearson	12.04316	5	.03420
Likelihood Ratio	14.38146	5	.01336
Mantel-Haenszel	8.42670	1	.00370

Minimum Expected Frequency - .465
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

GROUP1 by CURMATH

CURMATH Page 1 of 1

GROUP1	Count / Row Pct	1	2	Row Total
	1.00	2 50.0	2 50.0	4 1.3
	2.00	3 20.0	12 80.0	15 5.1
	3.00	6 8.0	69 92.0	75 25.3
	4.00	8 5.7	132 94.3	140 47.1
	5.00		60 100.0	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	19 6.4	278 93.6	297 100.0

Chi-Square	Value	DF	Significance
Pearson	22.07153	5	.00051
Likelihood Ratio	17.52908	5	.00360
Mantel-Haenszel	15.43208	1	.00009

Minimum Expected Frequency - .192
Cells with Expected Frequency < 5 - 7 OF 12 (58.3%)

GROUP 1 by CURPHON

CURPHON Page 1 of 1

GROUP 1	Count / Row Pct	1	2	Row Total
	1.00		4 100.0	4 1.3
	2.00	2 13.3	13 86.7	15 5.1
	3.00	15 20.0	60 80.0	75 25.3
	4.00	41 29.3	99 70.7	140 47.1
	5.00	20 33.3	40 66.7	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	78 26.3	219 73.7	297 100.0

Chi-Square	Value	DF	Significance
Pearson	7.51665	5	.18496
Likelihood Ratio	9.48136	5	.09134
Mantel-Haenszel	4.55201	1	.03288

Minimum Expected Frequency - .788
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

GROUP 1 by CURSCI

CURSCI Page 1 of 1

GROUP 1	Count / Row Pct	1	2	Row Total
	1.00	1 25.0	3 75.0	4 1.3
	2.00	6 40.0	9 60.0	15 5.1
	3.00	18 24.0	57 76.0	75 25.3
	4.00	22 15.7	118 84.3	140 47.1
	5.00	10 16.7	50 83.3	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	57 19.2	240 80.8	297 100.0

Chi-Square	Value	DF	Significance
Pearson	7.44370	5	.18968
Likelihood Ratio	7.27157	5	.20121
Mantel-Haenszel	4.78896	1	.02864

Minimum Expected Frequency - .576
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

GROUP1 by CURSOC

CURSOC Page 1 of 1

GROUP1	Count / Row Pct	1	2	Row Total
	1.00	1 25.0	3 75.0	4 1.3
	2.00	5 33.3	10 66.7	15 5.1
	3.00	34 45.3	41 54.7	75 25.3
	4.00	67 47.9	73 52.1	140 47.1
	5.00	25 41.7	35 58.3	60 20.2
	6.00	1 33.3	2 66.7	3 1.0
	Column Total	133 44.8	164 55.2	297 100.0

Chi-Square	Value	DF	Significance
Pearson	2.36724	5	.79634
Likelihood Ratio	2.42968	5	.78705
Mantel-Haenszel	.13862	1	.70966

Minimum Expected Frequency - 1.343
Cells with Expected Frequency < 5 - 4 OF 12 (33.3%)

GROUP 1 by CURSPLL

GROUP 1	Count / Row Pct	CURSPLL 1	CURSPLL 2	Row Total
	1.00	3 75.0	1 25.0	4 1.3
	2.00	4 26.7	11 73.3	15 5.1
	3.00	13 17.3	62 82.7	75 25.3
	4.00	35 25.0	105 75.0	140 47.1
	5.00	10 16.7	50 83.3	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	65 21.9	232 78.1	297 100.0

Page 1 of 1

Chi-Square	Value	DF	Significance
Pearson	10.30125	5	.06714
Likelihood Ratio	9.53323	5	.08959
Mantel-Haenszel	1.94414	1	.16322

Minimum Expected Frequency - .657
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

GROUP1 by CURVOC

CURVOC Page 1 of 1

GROUP1	Count / Row Pct	1	2	Row Total
	1.00	1 25.0	3 75.0	4 1.3
	2.00	7 46.7	8 53.3	15 5.1
	3.00	31 41.3	44 58.7	75 25.3
	4.00	44 31.4	96 68.6	140 47.1
	5.00	11 18.3	49 81.7	60 20.2
	6.00	1 33.3	2 66.7	3 1.0
	Column Total	95 32.0	202 68.0	297 100.0

Chi-Square	Value	DF	Significance
Pearson	9.75110	5	.08260
Likelihood Ratio	10.08173	5	.07295
Mantel-Haenszel	6.82937	1	.00897

Minimum Expected Frequency - .960
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

GROUP1 by CURWRTNG

CURWRTNG Page 1 of 1

GROUP1	Count / Row Pct	1	2	Row Total
	1.00	4 100.0		4 1.3
	2.00	7 46.7	8 53.3	15 5.1
	3.00	28 37.3	47 62.7	75 25.3
	4.00	31 22.1	109 77.9	140 47.1
	5.00	14 23.3	46 76.7	60 20.2
	6.00		3 100.0	3 1.0
	Column Total	84 28.3	213 71.7	297 100.0

Chi-Square	Value	DF	Significance
Pearson	20.18068	5	.00116
Likelihood Ratio	20.72406	5	.00091
Mantel-Haenszel	13.72084	1	.00021

Minimum Expected Frequency - .848
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

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Vita: PAUL S. KITCHEN

Education

- Andrews University, Berrien Springs, Michigan.
  Doctor of Philosophy Counseling Psychology, 1995.
- Andrews University, Berrien Springs, Michigan.
  Bachelor of Science in Counseling Psychology, minor in Biblical languages, 1991.

Publications

- Kitchen, P. (1991). Socialization of Home vs. Conventionally Schooled Children. Home School Researcher, 7(3), 7-13.

Presentations

- Socialization of Home vs Conventionally Schooled Children. Andrews University, Berrien Springs, MI,1991.
- Should I get counseling? Marcellus United Methodist Church, Marcellus, Michigan, 1993.

Offices

- Graduate Student Senate 1992.

Associations and Affiliations

- Phi Kappa Phi, Honor Society member.
- Psi Chi, Psychology Honor Society member.
- Andrews Scholars, Campus Honor Society alumni.
- American Psychological Association, student affiliate.
- American Association of Christian Counselors, member.

Honors

- Recipient of Weniger Fellowship.
- Graduated Honors, Magna Cum Laude; Andrews University, 1991.
- National Deans List, 1989, 1990, 1991.

Professional Experience

- Western Michigan Counseling Center, 1994-1995. (Doctoral Internship).
- K.C.M.S./Spectrum Adolescent Behavioral Medicine Clinic, 1994-1995 (Doctoral Internship).
- Mercy Memorial Medical Center Behavioral Medicine Unit, 1993-1994 (Doctoral Practicum).